PRENTISS.

White, best quality, early, good grower, very productive, hardy, good keeper. Is a native seedling with no foreign blood. Sells wholesale in New York at 15 to 18 cents per pound. Flesh tender, sweet, melting, juicy, with a pleasant musky aroma. Quality the best. Ripens with Concord.

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ILLUSTRATED

DESCRIPTIVE CATALOGUE

—OF—

American Grape Vines.

—A—

Grape Growers' Manual

—BY—

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VITICULTURISTS AND PROPRIETORS

BUSHBERG
VINEYARDS
AND
GRAPE NURSERIES,
Jefferson Co., Missouri.

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PREFACE

TO THIRD REVISED EDITION, 1883.

The BUSHBERG CATALOGUE has become a *vade mecum* of American Grape-growers; it has also been translated into French* and Italian,† an honor probably never before bestowed on any Nurserymen's Fruit Catalogue. Its reprint has long been demanded, but we could not consent thereto until we had leisure to thoroughly revise it. The great favor with which it was received, made us the more feel our duty to perfect it as far as was in our power. The experience and researches of these eight years, since the issue of the second edition, enable us to rectify some of its defects, to speak more definitely of the merits and demerits of many varieties, then new and untried, and to add a very large number of NEW GRAPES which have since been produced or introduced.

The AMERICAN GRAPE has also become of greater and more comprehensive importance by virtue of its now well established Phylloxera-resisting qualities, and. though grown in Europe chiefly as a grafting stock for their favorite kinds, every variety has been tested there;—some few, as the Lenoir (Jacques), Herbemont, etc., are largely planted for direct production,—thus enabling us to add to our own opinion that of the best foreign connoisseurs. Nor have we neglected to consult the views of other grape-growers, and to avail ourselves of the many valuable essays on the grape, written by eminent Horticultural authors, and scattered in books, newspapers and reports.

DR. GEORGE ENGELMANN, the celebrated Botanist, has enhanced the value of our Catalogue by revising for it his CLASSIFICATION OF THE TRUE GRAPE-VINES OF THE UNITED STATES. He has, in fact, entirely re-written it, and many illustrations, expressly made for this valuable treatise, have been added thereto. He has also favored us with a short essay on THE DISEASES OF THE GRAPE—*Mildew* and *Rot*, which were but briefly and deficiently treated in the previous edition, and which now occupy several pages, entirely devoted to this sad but most important subject. We are well aware that this chapter is still very defective, nor can the subject be satisfactorily treated until scientific researches and experiments may have found some practical means of curing or protecting our vineyards from these pests, not less destructive to our vineyards than the Phylloxera to those of Europe.

In this revised edition will also be found a far more exhaustive article on GRAFTING than was presented in the former, wherein we promised to publish the results of our experiments which were then but just commenced. Our experience in this now so important operation, and the excellent work of AIMÉ CHAMPIN, on the same subject, enable us to furnish a chapter which to many may be both valuable and interesting.

Assisted by Prof. C. V. RILEY, Chief U. S. Entomological Commission, we have been enabled to amplify the chapter on INSECTS by a brief account of the beneficial species, useful to the grape-grower.

At the repeated request of a large number of grape-growers, we have added a few hints on the subject of WINE-MAKING, which may not be quite useless to beginners, though we have not changed our opinion (expressed in former edition) as to the impossibility of furnishing a valuable guide in a few pages, or as to the necessity of practical knowledge and experience, in order to succeed.

But far more than the GRAPE MANUAL has the DESCRIPTIVE part of this Catalogue been augmented. Many new varieties and good illustrations of the same have been added, and every line of the Descriptive portion of the former publication has been carefully revised.

The favorable and highly complimentary opinions voluntarily expressed by our most prominent Horticulturists, with regard to the previous edition (1875), permit us to hope that this new one will meet with a still more favorable reception.

That it may be useful to our grape-growers and enhance their love of the noblest fruit and its culture, is the wish of

BUSH & SON & MEISSNER.

Bushberg, Mo., October, 1883.

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* LES VIGNES AMERICAINES, Catalogue illustré et descriptive par MM. Bush et fils et Meissner; ouvrage traduit de l'anglais par *Louis Bazille*. Revu et annoté par *J.-E. Planchon*, Montpellier, C. Coulet. Paris, V.-A. Delahaye et Cie.

† LE VITI AMERICANE, Catalogo illustrato e descrittivo per Bush & Son & Meissner, Opera tradotta dall'inglese da Farina e comp. Viticoltori in Castellanza, 1881.

[FROM FIRST EDITION, 1869.]

Our success in grape growing, and in the propagation of grape vines, has been highly satisfactory, in fact, far beyond our expectations. In view of the very great competition of even large, well-known and long-established nurseries, this success is highly flattering, and has encouraged us to increase our efforts so as to produce, for next season, a large stock, not excelled in quality by any other establishment in the country, and embracing almost every valuable variety.

We do *not* pretend to furnish "*better and cheaper* vines than can be afforded by any other establishment." We do *not* pretend that "money-making is secondary with us," we leave this to others; all we *do* claim is, that we hope to *merit* a reasonable share of patronage, the continued confidence of our customers, and a fair profit.

In this connection, we cannot refrain from referring with a certain pride to the voluntary assurances of satisfaction we have received. Desiring to return our thanks to our customers in an appropriate and tangible form, and to respond to a desire often expressed by our correspondents, we concluded to present them with a fine *Illustrated and Descriptive Catalogue*, wherein the characteristic and relative merits of our different varieties are clearly stated.

We leave it to others to judge of its merits. We tried to produce something better than a mere price list, something that will be interesting and useful to progressive grape culturists, and have not spared time, labor or money in preparing it.

It has become customary to prefix to a Descriptive Catalogue of fruits and flowers some brief directions for their cultivation, and we have been urged to do the same.

We are aware, however, that some short and very incomplete directions, "a few hints," do more harm than good. They generally serve only to confuse the tyro or misrepresent grape growing as a very easy matter, requiring no larger outlay of capital, nor any more knowledge, skill, and labor than is necessary to produce a crop of corn. This we do *not* wish to do. But on the other hand we are also aware that the excellent but somewhat costly books on grape culture, by Fuller, Husmann, Strong, and others, are not purchased by every grape grower, and that many of these are somewhat afraid of reading whole books. Moreover, considerable progress has been made in grape culture since these books were written; their very authors, indefatigable horticulturists as they are, have by study and experience, modified their views on some points, but have not had time or encouragement enough from their publishers to rewrite their works for new editions. Thus we came to the conclusion that a short manual, containing plain but full directions in regard to the planting, culture, and training of grape-vines, and offered for less than its cost, would be welcome. We have availed ourselves of the writings of our friend and teacher, Husmann, and of the works of Downing, Fuller, and many others, to whom due credit is given in the proper places; and while we lay little claim to originality, we hope that this Catalogue may afford pleasure and profit to some of those at least into whose hands it may come.

[INTRODUCTION TO SECOND EDITION, 1875.]

Six years, embracing the most disastrous and the most favorable seasons to grape culture, have elapsed since the first edition of this Catalogue. Our experience has been enriched, observations have been made on old, and on then untried varieties, and some very promising *new varieties* have since been added to our list, but above all, one circumstance, the discovery of the Grape Root-louse, the Phylloxera, has led to a new, RADICAL study of the American Grape Vines.

Our business as grape growers and propagators assumed such large dimensions that we discarded the culture and propagation of small fruits, etc., and devoted all the space of our grounds, all our means, cares and attention to GRAPE CULTURE ONLY AND EXCLUSIVELY, for which we have unusual facilities, and a most favorable soil and location. This enables us to raise a superior stock, and to make it more advantageous to the public, and even to the leading nurseries of other branches of Horticulture, to deal with us, whose grape-nursery business is now admitted to be the first and most extensive of its kind in the United States of America.

We owe our reputation to our determination to give complete satisfaction, and to deserve the entire confidence of our customers, furnishing none but good, healthy, genuine plants, unmixed, and true to name, packed in the best manner, at as low prices as possible.

We have no seedlings of our own, and impartially recommend such varieties only, new or old, as have real superior merit, and while the demand compels us to disseminate some inferior varieties (*Hartford Prolific* for instance) and untried novelties, over-praised, perhaps, by their originators, our Descriptive Catalogue shall save the reader from some of the bitter disappointments which grape growers have so often experienced. For the sake of completeness, and in the interest of science, we have added (in smaller type) the description of nearly all the old discarded varieties, and of many new ones not yet tested and not propagated by us; thus adding, we think, to the value of this Catalogue (though also to its cost).

We have carefully endeavored to avoid all undue praise, and to mention the shortcomings of even our best varieties; we especially desire to warn against the error of considering ANY variety fit for universal cultivation. To this end a study of the CLASSIFICATION of our grapes in the *Manual*, is earnestly recommended. Many failures will thus be avoided which have blasted the hopes, so prevalent ten years ago throughout the country, with regard to grape culture; and its *success*, now aided by a higher tariff on imported wines, by increased demand for the fruit and its products, by less sanguine expectations, and, above all, by better knowledge as to the selection of varieties, locations and proper mode of culture, will be comparatively certain.

Finally we beg to state that WE HAVE NO AGENTS to solicit orders for our Grape Vines. Persons who desire to obtain plants from us will kindly favor us with their orders by mail, *direct*, or through *reliable* Nurseries or dealers who get them from us.

TESTIMONIALS.

We could fill a book with voluntary testimonials of prominent Horticulturists, Grape-growers and Nurserymen, who favored us with their commands, and to whom we may confidently refer; but we flatter ourselves that our name is so widely known, and our reputation so well established, that testimonials are unnecessary.

GRAPE MANUAL.

CLIMATE, SOIL AND ASPECTS.

Whether the Grape-vine is a native of Asia, and has followed the footsteps of man from the shores of the Caspian Sea, and "intertwined its tendrils with civilization and refinement in every age," or whether the hundreds of varieties that now exist spring from different primordial forms or species, certain it is that, although the Grape-vine may be found in Europe from the Tropic of Cancer to the Baltic Sea, and in America from the Gulf to the Lakes, the vine is nevertheless peculiarly the growth of definite climatic conditions; so much so that even in its most adapted climate there are often seasons if not of actual failure, at least of an imperfect development of its fruit. From long and careful observations of temperature and moisture, in years of success and failure, we have finally arrived at some definite conclusions respecting the meteorological influences affecting the grape.*

1st. No matter how excellent the soil, if there is a less average than fifty-five degrees of temperature for the *growing* months of April, May and June, and a less average than sixty-five degrees for the *maturing* months of July, August and September, there can be no hope of success; and where the temperature averages sixty-five degrees for the former months and seventy-five for the latter, other conditions being equal, fruit of the greatest excellence can be raised, and wine of the greatest body and finest quality can be produced.

2d. When there is an average rainfall of six inches for the months of April, May and June, and an average of 5 inches for the months of July, August and September, though other conditions were favorable, we cannot succeed in raising grapes. When the average rainfall for the first months is not more than four inches, and the average for the latter is not more than three inches, other conditions favorable, the *hardy* varieties can be cultivated with success. But where there is less average rainfall than five inches for April, May and June, and a less average than two inches in July, August and September, all other conditions being favorable, fruit of the best quality can be raised, and wine of the greatest body and excellence can be made. The humidity of the atmosphere in some countries, the dryness of the air in others, will, of course, materially change the proportion of rainfall required for, or injurious to the grape. Here, a clear sky and dry atmosphere, high temperature and very little rainfall for the latter three months, and a less change of temperature than 50 degrees in twenty-four hours, any time of the year, are favorable conditions for success.

With regard to the necessity of attention to the most advantageous climatic conditions, says Mr. William Saunders (the eminent superintendent of the Experimental Gardens of the U. S. Department of Agriculture), "It is enough to remark, that where these are favorable, good crops of fruit are the rule, and that too, even in the absence of experience in cultivation; but in unfavorable locations the application of the highest attainments in the art and science of grape culture, so far as relates to pruning manipulations or culture and management of soil, will *not* insure success. Grape culture has now reached a point from which but little further progress can be made without a close recognition of the requirements of the plant, in connection with local climatic conditions, the most important being that of freedom from heavy dews (freedom from those cryptogamic diseases—mildew and rot). The topographical configuration of a locality is of far more importance than its geographical formation. Where the atmospheric conditions are favorable, satisfactory results may be obtained, even from poor soils, but in ungenial climates the very best soils will not guarantee success."

Moreover, with our present and increasing facilities of transportation, grape culture on a large scale cannot be remunerative, except in favorable localities which will produce the best quality almost every year with certainty. Where the production is low in quality and

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*James S. Lippincott: Climatology of American Grapes.—*Id.* Geography of Plants—*U. S. Agr. Reports*, 1862 and 1863—Dr. J. Stayman: The Meteorological Influences affecting the Grape.

quantity, and often entirely fails, grape culture may exist on a small scale for home use and market, but on a large scale it will not reward the vintner's labor, and would finally be abandoned. As California in the West, so does Virginia in the East, and parts of Texas and Arkansas in the South, seem to possess the best localities for grape culture on a very large scale.

There are only a few countries where the grape will, in favorable seasons, grow to perfection, and there is no country in the world where *all* kinds of grapes would succeed. Species found in the lower latitudes will not flourish if removed further north; the natives of higher altitudes will not endure the southern heat; the Scuppernong cannot ripen north of Virginia; the Fox grape of the North will scarcely grow in the lower regions of Carolina and Georgia; a vine which produces delicious grapes in Missouri may become very inferior in the most favored localities of New Hampshire.

Thus the climate, the mean temperature as well as the extremes, the length of the growing season, the relative amount of rain, the ameliorating influence of lakes and large rivers, the altitude as well as the soil, have an almost incredible influence on various varieties of grapes; and a judicious choice of locations adapted to the grape, and of varieties adapted to our location, its climate and soil, is therefore of the first importance.

"No one grape is suited to all localities; neither is there any one locality which is suited to all grapes."—*G. W. Campbell.*

Notwithstanding that over 1500 varieties are cultivated in Europe, yet the number of kinds especially adapted to the different localities is very limited for each of them, and we seldom find more than three or four varieties to form the main bulk of the vineyards of the different sections; each province, county or township even, having its own special favorites. This question of adaptability to soil and local climate is one of the greatest importance, and should be closely studied by the intelligent grape grower if he would make its culture a success. No existing variety, and probably none that will ever be produced, is well adapted to general cultivation in more than a limited portion of this vast country. This limitation is not determined by isothermal lines. Success or failure of a variety depends not only on degrees of heat and cold; not only on earliness or lateness of seasons, however important factors these may also be, but on numerous causes, some of which we cannot, so far, sufficiently understand and explain. We need but remember that the grapes we cultivate in the United States have originated from one or the other of several distinct species, or from crosses between some of their varieties, and that each of those native species is found growing wild in certain limited portions of our country, and not at all in others. Thus the *wild* Labrusca is a stranger to the lower Mississippi Valley and westward. By observing what species grows in a locality, we may safely assume that cultivated varieties of the same species will thrive best in that locality or its vicinity under otherwise proper conditions. Where the native species does *not* exist, its cultivated varieties may for a time promise excellent success; but in many localities this promise will probably, sooner or later, end in disappointment. This has been our sad experience even with the *Concord*, which is generally considered the most reliable, healthy and hardy American grape.

On the other hand this proposition seems to conflict with the fact that American vines of different species have been successfully transplanted even to *Europe*. But it would be a great mistake to believe that they would succeed in all parts of that continent. It was found, on the contrary, that there also some of our varieties which succeed well in one portion of France, for instance, entirely failed in others; and this only proves that we may find in far-off foreign lands localities which exactly correspond in soil, climate, etc., with certain localities in our own country, and where this is the case, well and good; but where these are different the results are unsatisfactory. In evidence we quote from the report of the commission, composed of some of the best French authorities, to the International Phylloxera Congress, in Bordeaux (Oct., 1882). After giving a detailed report of their observations in the principal vineyards of France where American vines have been planted, they say, "But they (these resisting American vines) do by no means succeed equally well in all locations. The nature of the terrain and the climate must be taken into serious consideration. But was it not one of the great difficulties with the French vines to know which variety suited such or such soil or aspect? How many failures were the consequence of bad selection! It is, of course, the same with American vines, coming from widely different conditions of temperature, humidity and altitude."

Unfortunately, this has been and is even now but insufficiently understood.

Indigenous wild grapes were found at the discovery of this new world; the legend tells us that when the Norsemen first discovered

this country "Hleif Erickson" called the land *Vineland*. As early as 1564 wine was made by the first colonists in Florida from the native grape. The Pilgrim fathers saw vines in abundance at Plymouth. "Here are grapes, white and red, and very sweet and strong also," wrote Jos. Edward Winslow in 1621. Rev. Fr. Higginson, writing in 1629 from the Massachusetts Colony says "Excellent vines are here, up and down in the woodes. Our governor has already planted a vineyard, with great hope of increase." Thus, during the previous centuries grapes were cultivated, and wine has occasionally been made in America from native grapes; (the French settlers near Kaskaskia, Ills., made, in 1769, one hundred and ten hogsheads of strong wine from wild grapes)—"but neither the quality of the wine nor the price obtained for it offered sufficient inducement to persevere."—*Buchanan.*

The European grape, *Vitis Vinifera*, was, therefore, considered the only true wine grape.

In 1630, a London company sent French vignerons into the Virginia Colony to plant grapevines which they had imported for the purpose; the poor vignerons were blamed for their failure. In 1633 Wm. Penn vainly tried to introduce and cultivate European varieties in Pennsylvania. In 1690 a Swiss Colony, grape growers from Lake Geneva, tried to raise grapes and make wine in Jessamine County, Kentucky, but their hopes were soon frustrated; their labor and fund—$10,000, a large amount in those days—were lost; and only when they commenced to cultivate an indigenous grape, which, however, they supposed to be from the Cape (see description of *Alexander*), they had somewhat better success. The attempts with German, French and Spanish vines, made again and again, proved failures. Hundreds of thousands (comprising many different sorts) of the best European vines were imported, but they all perished "from the vicissitudes of the climate." Thousands of failures are recorded; not one of durable success; and Downing was fully justified in saying (*Horticulturist*, Jan., 1851), "The introduction of the foreign grape into this country for open vineyard culture is *impossible*. Thousands of individuals have tried it—the result in every case has been the same—a season or two of promise, then utter failure."*

While this fact could not be denied, the cause remained a mystery. All pronounced the European grape as "unsuited to our soil and climate;" all attributed its failure to that cause. But we, and doubtless many others with us, could not help thinking that "soil and climate" cannot be the sole causes; for this vast country of ours possesses a great many locations where soil and climate are quite similar to those of some parts of Europe where the Vinifera flourishes. Is it reasonable to suppose then, that none of the many varieties which are grown in Europe under such varied climatic conditions, from Mainz to Naples, from the Danube to the Rhone, should find a congenial spot in these United States, embracing almost every climate of the temperate zone? If soil and climate were so unsuited, how is it that the young, tender European vines grow so well, so promising of success, for a few seasons; in large cities sometimes even for several years? How explain the fact that the finest European varieties of other fruits, the pear for instance, are successfully grown here in some localities, and that, but for the curculio, the Reine Claude and German Prunes would flourish here as well as there? Slight differences of soil and climate might well produce marked differences in the constitution of the vine, perhaps also somewhat change the flavor and quality of the grapes, but could not sufficiently account for their absolute failure. Nevertheless our learned horticulturists looked for no other cause; they even went so far as to teach that "if we really wished to *acclimate* the foreign grape here, we must go to the seeds, and raise two or three new generations in the American soil and climate." In obedience to these teachings, numerous fruitless attempts have been made here to raise seedlings of the European grape that will *endure our climate*. Like their parents they seemed successful for a time†—to be soon discarded and forgotten. But, in

* Always excepting California, which was then almost unknown, but which is now the greatest wine-producing State of this country. There, from the counties bordering the Bay of San Francisco down to Colorado river, several hundred varieties of the best European grapes are successfully cultivated; and even since the appearance of the Phylloxera, evidently introduced from Europe on imported vines, American grapes are not in demand there, except for the purpose of grafting thereon European varieties. Quite recently the *Soudan grape*, a vine discovered on the banks of the Niger, in Africa, has been introduced into California; a few plants are now growing from seed received by C. A. Wetmore, and may also succeed there, in Los Angeles and San Bernardino counties. This peculiar vine is an *annual*, but has a tuberous perennial root. The seeds are much like those of other grapes; the leaves resemble some Rotundifolia varietes of the S. A. S.

All our remarks on grape culture refer only to the States east of the Rocky Mountains, unless otherwise expressly stated.

† Among the seedlings of foreign grapes raised in the U. S., which obtained a name and fame, are: *Brinkle* and *Emily*, raised by Peter Raabe of Philadelphia; *Brandywine*, originated near Wilmington, Del.; *Katarka* and *Montgomery*, or Merritt's Seedling, raised by Dr. W. A. Royce, of Newburg, N. York. To these belong also *Clara* and *Weehawken* (see description). N. Grein, of Hermann, Mo., introduced, about ten years ago, some very good new grapes, which he claimed (and honestly believed) to have raised from seed of the German Riesling. They proved to be *not* seedlings of the European Riesling at all, but of the American *Taylor* grape, and are now known as Missouri Riesling, Grein's Golden, &c. (see these varieties.) George Haskell, a most persevering

absence of any satisfactory reason for these failures, it is quite natural that renewed attempts were and are continually made.* In the spring of 1867, we ourselves imported from Austria about 300 rooted vines (Veltliner, Blue Baden, Riesling, Tokay, Uva Pana, &c.), not with expectations of success in open air culture, but with a view to discover, by careful observation, the real cause of failure, and knowing the true cause, to be then, perhaps, able to obviate it. The vines grew splendidly, but during the summer of 1869, though bearing some beautiful fruit, their foliage began to wear a yellow, sickly appearance. In 1870 many were dying and we almost despaired of discovering the cause, when Prof. C. V. Riley, then our State Entomologist, informed us that the discovery had just been made in France, by Planchon and Lichtenstein, that the serious grape disease which had attacked their noble vineyards was caused by a root-louse (Phylloxera), which bears a close resemblance to our American grapeleaf gall-louse, an insect long known here. In 1871 and since, Prof. Riley often visited our vineyards, as we gave him full permission and cheerfully assisted him to unearth both diseased and healthy vines, native and foreign, of every kind, in order to examine their roots and to study the question. By his observations and those of Prof. Planchon, made by both in this country as well as in France, and afterwards confirmed and verified by all prominent naturalists, the identity of the American insect with the one discovered in France, and of the two types, the gall and the root-lice, has been substantiated. Thus, the principal cause of the absolute failure of European vines in this country has been discovered, but no satisfactory remedy has been found. So far, it seems impossible to destroy or to guard against this insect enemy; while the vigorous roots of our American vines enjoy a relative immunity from its injuries, the pest thrives on the tender roots of the European vines, which readily succumb.

The French Commission, in its report to the Viticultural Congress, held at Montpellier, Oct. 1874, came to the conclusion that "In presence of the non-success obtained from all attempts made since 1868, with a view to preserve or cure our vines, and feeling that after six years of efforts in this direction, no process except submersion has been found effective, many persons are quite discouraged, and see in the American vines, whether justly so or not, the *only* plank of safety." Since that time, wheresoever the most careful, practical grape-growers and most scientific naturalists met and exchanged their views, as at the International Congress held at Lyons, France, and at Saragossa, Spain, in 1880; at Bordeaux in 1881, the leading principle established has been: "that the Phylloxera cannot be exterminated where it once infests the vineyards, nor can its introduction be prevented by any precautionary measures; but that there are some means whereby, in spite of the insect, we may yet save our vineyards from destruction, and enjoy their richly paying returns; and that the most practical, the simplest, cheapest and surest means is by planting the resisting American grapes." Already millions of American grapevines are growing in France, hundreds of thousands in Spain, Italy, Hungary, etc. How much more, then, must WE look to species which we find indigenous here, and to their descendants, for success in grape culture.

A knowledge of the distinctive permanent characters of our species, and a proper classification of our varieties, referable to them, is of far more importance than is generally supposed.* And while many grape-growers may skip over the following pages as useless, we hope that *some* of them will thank us for embodying in this catalogue the valuable treatise on this subject by the best living authority—Dr. G. Engelmann (who has also kindly revised—aye, almost entirely re-written it for this new edition). Twenty-five years ago Robert Buchanan wrote in his book on the culture of the grape: "The perfection of a definite arrangement of all our varieties must remain for future labors, but it is to be hoped an end so desirable will not be lost sight of."

experimenter, says "I raised many hundred vines from seeds of different foreign grapes. These seeds were planted under glass, and the vines remained in the house two years, when they were removed to the open air. None of them proved healthy * * * * they all died in a few years, though well covered in winter."

*Thos. Rush, a German, planted (in 1860) varieties of the Vinifera on Kelley's Island; they seemed to succeed the first three years remarkably well, then they died and were replaced by Catawba vineyards.

As late as 1872, M. J. Labiaux, at Ridgway, North Carolina, undertook to plant vineyards with 70,000 cuttings (principally Aramons), imported from Southern France. In the same vicinity, Eug. Morel, a pupil of Dr. Jules Guyot (the best authority on French grape culture), and others, were also cultivating several thousands of European vines—without success.

The only satisfactory method of obtaining the fine *foreign grapes* in this country is under glass, by the use of the grapery. This, however, so far, is done on a very limited scale only, as a luxury for the table; and even there the roots of the vines in the outside border are exposed to the danger of being infested by the Phylloxera; so that vines grafted on American roots should be used. Those who desire and can afford to enjoy this luxury we refer for information to Peter Henderson's excellent books on gardening.

*Even A. S. Fuller, in his excellent Treatise on Grape Culture, written in 1866, said "Practically it is of little consequence what view is taken of these unusual forms (of distinct species, or marked varieties of the species), as the cultivator is interested in them only as varieties, and it is of no particular moment to him whether we have one hundred or only one native species." We are satisfied that he considers it of far more consequence now.

THE TRUE* GRAPE-VINES OF THE UNITED STATES.

BY DR. G. ENGELMANN.

The Grape-vines are among the most variable plants, even in their wild state, in which climate, soil, shade, humidity, and perhaps natural hybridization, have originated such a multiplicity and such an intermixture of forms, that it is often difficult to recognize the original types and to refer the different given forms to their proper alliances. Only by carefully studying a large number of forms from all parts of the country, in their peculiar mode of growth and especially their fructification, or rather their seeds, are we enabled to arrive at any thing like a satisfactory disposition of these plants. (Table of Grape Seeds; fig. 1-33, page 13.)

Before I proceed to the classification of our Grape-vines, I deem it necessary to make a few preliminary remarks:

The grape-vines cultivated in that part of the United States lying east of the Rocky Mountains are all natives of the country, most of them picked up in the woods; some, perhaps, improved by cultivation; and a few the product of natural or artificial hybridization. In that part of the country the wine grapes of the Old World can only be cultivated under glass; but in New Mexico and California they have been successfully introduced by the Spaniards, and in the latter State a great many varieties are now extensively cultivated, and promise to make one of the great staples of that region; but eastward and northward they have entirely failed, owing to the destructive effects of that now so well known and dreaded insect, the Phylloxera, of which more, further on.

All the true Grape-vines bear fertile flowers on one stock, and sterile flowers on another separate stock, and are, therefore, called *polygamous*, or, not quite correctly, *diœcious*. The sterile plants do bear male flowers with abortive pistils, so that while they never produce fruit themselves, they may assist in fertilizing the others; the fertile flowers however, are hermaphrodites, containing both organs—stamens and pistils—and are capable of ripening fruit without the assistance of the male plants.† Real female flowers, without any stamens, do not seem ever to have been observed Both forms, the male and hermaphrodite, or if preferred, those with sterile and those with complete flowers, are found mixed in their native localities of the wild plants, but of course, only the fertile plants have been selected for cultivation, and thus it happens that to the cultivator only these are known; and as the Grape-vine of the Old World has been in cultivation for thousands of years, it has resulted that this hermaphrodite character of its flowers has been mistaken for a botanical peculiarity, by which it was to be distinguished, not only from our American Grape-vines, but also from the wild grapes of the Old World. But plants raised from the seeds of this, as well as of any other true Grape-vine, generaliy furnish as many sterile as fertile specimens, while those propagated by layering or by cuttings, of course, only continue the individual character of the mother-plant or stock.*

The peculiar disposition of the tendrils in the Grape-vines furnishes an important characteristic for the distinction of one of our most commonly cultivated species, *Vitis labrusca*, its wild and its cultivated varieties, from all others. In this species—and it is the only true *Vitis* exhibiting it—the tendrils (or their equivalent, an inflorescence), are found opposite *each* leaf, and this arrangement I designate as *continuous tendrils*. All the other species known to me exhibit a regular alternation of two leaves, each having a tendril opposite it, with a third leaf without such a tendril, and this arrangement may be named *intermittent tendrils*. Like all vegetable characters, this is not an absolute one; to observe it well it is necessary to examine well-grown canes, and neither sprouts of extraordinary vigor, nor

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*We treat here only of the *true* grape-vines, with edible berries. In the flowers of these the small green petals do not expand, but cohere at the top, and separating from their base, fall away together as a little five-lobed hood. The flowers, and consequently the fruit, are arranged in the well-known clusters (thyrsus). Thus they are distinguished from the *false* grape-vines (botanically known as *Ampelopsis* and *Cissus*), which often resemble the true grape-vines very much, but bear no edible berries. Their flowers expand regularly, opening at top, and are arranged in broad, flat-topped clusters (corymbs).

†These fertile plants, however, are of two kinds; some are *perfect hermaphrodites*, with long and straight stamens around the pistil; the others bear smaller stamens, shorter than the pistil, which soon bend downward and curve under it; these may be called *imperfect hermaphrodites*, approaching females, and they do not seem to be as fruitful as the perfect hermaphrodites, unless otherwise fertilized.

It is proper here, to insist on the fact that nature has not produced the male plants without a definite object; and this object, without any doubt, is found in the more perfect fertilization of the hermaphrodite flowers, as it is a well established fact that such cross fertilization produces more abundant and healthier fruit. Vine growers might take a hint from these observations, and plant a few male stocks in their vineyards, say 1 to 40 or 50 of their fertile stocks, and might expect from such a course healthier fruit, which would probably resist rot and other diseases better than fruit grown in the ordinary way. I would expect such beneficial influence especially in all varieties that have short stamens, such as the Taylor. Male stocks can be easily obtained, either in the woods or from seeds. It is of course understood that the males ought to belong to the same species (or better, to the same variety) as the fertile plants to be benefitted by their pollen. European vine growers may also profit by this suggestion.

*Some observations (rather loose, to be sure) seem to point to the possibility of the sexual characters of the grape-vines becoming changed under certain circumstances; and, though I have not seen a case of this kind myself, nor heard of an instance where fertile vines in cultivation began to bear sterile (male) flowers, there is no absolute impossibility in it, as we know that other plants (willows for example) occasionally sport in this manner.

stunted autumnal branchlets. The few lowest leaves of a cane have no opposite tendrils, but after the second or third leaf the regularity in the arrangement of the tendrils, as above described, rarely fails to occur. In weak branches we sometimes find tendrils irregularly placed opposite leaves, or sometimes none at all.

It is a remarkable fact, connected with this law of vegetation, that most Grape-vines bear only two inflorescences (consequently two bunches of grapes) upon the same cane, while in the forms belonging to *Labrusca* there are often three, and sometimes, in vigorous shoots, four or five, or rarely, even more in succession, each opposite a leaf. Whenever in other species, in rare cases, a third or fourth inflorescence occurs, there will always be found a barren leaf (without an opposite inflorescence) between the second and third bunches.

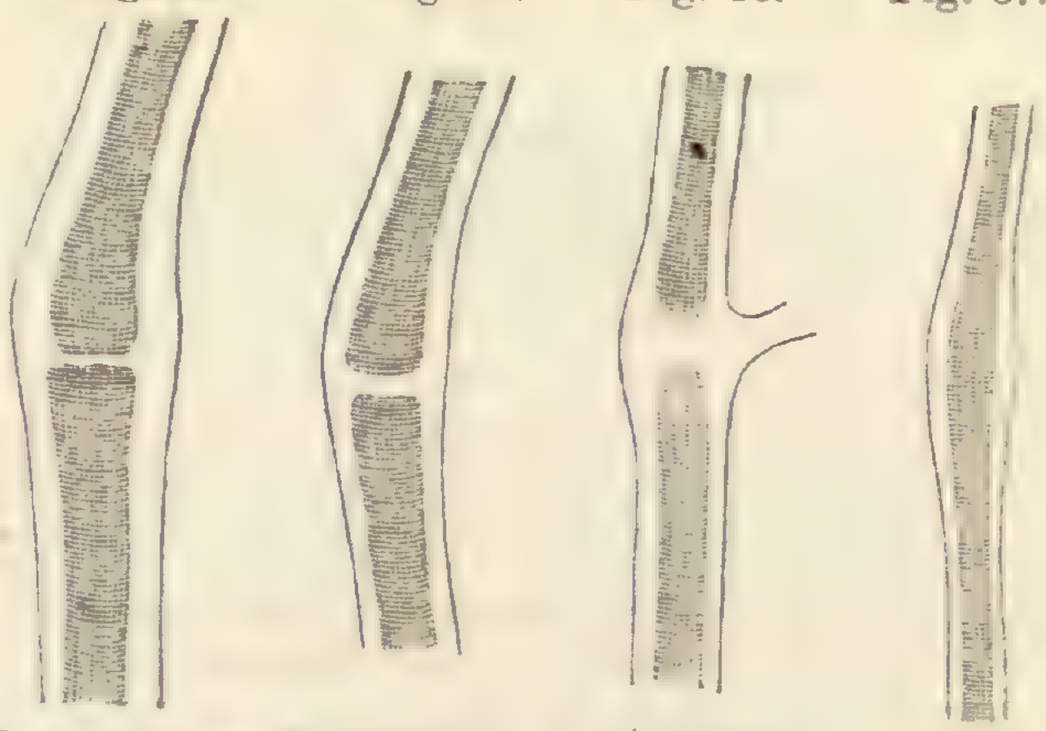
Another valuable character, discovered by Prof. Millardet, of Bordeaux, is found in the structure of the branches ("canes," as they are usually called). These contain a large pith, and this pith is transversely separated at each node (point where a leaf is or has been inserted), by what is called a diaphragm. These diaphragms consist of harder, solid pith, of the appearance of wood, and are examined best in canes 6 to 12 months old, when the pith has turned brown and the diaphragm is whitish; A longitudinal section through the cane will best exhibit them. They are, in most species, 1 to 2 lines thick; but in the Riverbank grape, *Vitis riparia*, the diaphragm is not more than $\frac{1}{8}$ to $\frac{1}{4}$ line thick; and in the Sand, or Rock grape, *Vitis rupestris*, it is very little thicker. For us here, the distinction of these species is of no great practical importance; but, as a considerable demand for them has sprung up in Europe, it is well to characterize them accurately; and this character holds good in winter, when all others of foliage or fruit have disappeared. There is only one American Grape-vine, also in other respects an aberrant form, the Southern Muscadine grape, *Vitis vulpina*, which is entirely destitute of such diaphragms.

The cut represents the diaphragms of different species. Fig. 34, *Vitis riparia*, with the thinnest, and fig. 36, *Vitis cordifolia*, with a thick diaphragm; *Vitis æstivalis*, is similar to this last, and *Vitis labrusca* scarcely thinner; but fig. 35, *Vitis rupestris*, has a diaphragm not much thicker than the first. Fig. 37 shows *Vitis vulpina* without any partition.

It is well known that some species of *Vitis* grow well from cuttings, while others are difficult to propagate in this way.

Easy to propagate are *Labrusca*, *Monticola Riparia, Rupestris and Palmata*. Almost impossible to propagate by cuttings are *Candicans*, *Æstivalis*, *Cinerea*, *Cordifolia*, *Vulpina*, and probably *Californica*. *Arizonica and Caribea* I do not know in this respect. That the southern cultivated forms of *Æstivalis* grow more or less readily from cuttings is stated further on (page 16).

Fig. 34. Fig. 35. Fig. 36. Fig. 37.



V. riparia. V. rupestris. V. cordifolia. V. vulpina.

The structure of the bark of the young canes shows also differences in the different species, but as the characters are to some extent of microscopical detail they are here omitted. The bark of the mature canes is ashy gray (*V. cordifolia, V. Cinerea*), to red or brownish *V. æstivalis*); it peels off after the first season in large flakes, or in narrow strips or shreds; only in the Muscadine grape the dark gray bark does not peel off at all, at least not for a number of years.

Young seedlings of all the Grape-vines are glabrous or only very slightly hairy. The cobwebby or cottony down, so characteristic of some species, makes its appearance only in the more advanced plants; in some of their varieties, and not rarely in the cultivated ones, it is mainly observed in the young growth of spring and is apt to disappear in the mature leaf; but even then such leaves are never shining as they are in the glabrous species, but have a dull or unpolished, or even wrinkled surface.

The form of the leaves is extremely variable, and descriptions must necessarily remain vague. They are usually cordate at base, either with an acute and narrow sinus (*V. cordata*, and many other species), or with a broad and wide one (*V. riparia* and *V. rupestris*). Leaves of seedling plants are all entire, i. e. not lobed; young shoots from the base of old stems, as a rule, have deeply and variously lobed leaves, even where the mature plant shows no such disposition. Some species (*V. riparia*), or some forms of other species (forms of *V. labrusca* and *V. æstivalis*), have all the leaves more or less lobed, while others exhibit, on the mature plant, always entire, or, I should rather say, *not lobed* leaves; the leaves of *V.*

rupestris and *V. vulpina* are never lobed. Only the leaves of flower-bearing canes ought to be considered as the normal ones.

The surface of the leaves is glossy and shining, and mostly bright green. or in *rupestris* pale green ; or it is dull above and more or less glaucous below. The glossy leaves are perfectly glabrous, or they often bear, especially on the nerves of the lower side, a pubescence of short hair. The dull leaves are cottony or cobwebby. downy on both or only on the under side, and this down usually extends to the young branches and to the peduncles, but, as has been stated above, often disappears later in the season.

On both sides of the insertion of the petiole or leafstalk into the branchlet, we find on very young, just developing shoots, small accessory organs, which soon disappear ; they are the stipules. In most species they are thin, membranaceous, rounded, at the top somewhat oblique, smooth in some, downy or woolly in other species. They are most conspicuous and elongated in *Vitis riparia*, in which I find them 2½-3 lines long ; in *V. rupestris* they are 1½-2½ lines in length ; in *V. candicans* and *Californica* scarcely shorter, in *V. labrusca* 1½-2 lines long ; in *V. æstivalis*, *cordifolia*, and most others, they are only one line long or less ; in very vigorous young shoots they may sometimes be larger, just as their leaves are also larger than the normal.

Not much of a distinctive character can be made out of the flowers. It is observed, however, that in some forms the stamens are not longer than the pistil, and very soon bend under it, while in other forms they are much longer than the pistil, and remain straight till they fall off. It is possible that those with short stamens are less fertile than the others.*

The time of flowering is quite characteristic of our native species, and it seems that the cultivated varieties retain herein the qualities of their native ancestors. The different forms of *Riparia* flower first of all ; soon afterwards comes *Rupestris*, next *Labrusca* and its relatives, and later *Æstivalis* comes in bloom. One of the last flowering species is *Cordifolia*, and still later, *Cinerea*. *Vinifera* seems to flower soon after *Labrusca*, but it is not cultivated here, nor is *Vulpina*, which is probably the latest of all. *V. candicans* apparently blooms about the same time that *Labrusca* does.

Riparia begins to open its flowers about St. Louis three to five weeks earlier than the first blossoms of *Æstivalis* are seen in the same locality. In favorable situations and in early seasons they make their appearance in this vicinity as early as April 25th, at other seasons sometimes as late as May 15th, or even 20th, on the average about May 10th, and generally about the time when the Acacias (Black Locusts) bloom, both filling the atmosphere with the sweetest prefumes. *Cordifolia*, and, after this, *Cinerea*, on the contrary, bloom from the last days in May to (in late seasons) the middle of June, when that weed among trees, the fetid Ailantus (misnamed the tree of Heaven), exhales its nauseous odors and the beautiful Catalpa expands its gorgeous bunches of flowers. *V. palmata* (Vahl), of which we do not yet know much, seems to be the latest flowering Grape-vine with us, flowering even after *Cinerea*. Thus we are not likely to have any Grape-vines in flower *here* before April 25th or after June 20th.

One of the botanical characters of the Grape-vine is found in the *seeds*. The bunches may be larger or smaller, looser or more compact, branched (shouldered) or more simple, conditions which, to a great extent, depend on variety, soil and exposure ; the berries may be larger or smaller, of different color and consistency, and contain fewer or more seeds (never more than four), but the seeds, though to some extent variable, especially on account of their number* and mutual pressure, where more than one is present, exhibit some reliable differences. The big top of the seed is convex or rounded, or it is more or less deeply notched. The thin lower end of the seed, the beak, is short and abrupt, or it is more or less elongated. On the inner (ventral) side are two shallow, longitudinal irregular depressions. Between them is a ridge, slight where there are one or two seeds, or sharper where the seeds are in threes or fours ; along this ridge the *raphe* (the attached funiculus or cord) runs from the *hilum*, at the beak, over the top of the seed, and ends on its back in an elongated, oval or circular well-marked spot, called by botanists *chalaza*. This raphe is on that ridge represented by a slender thread, which on the top and back of the seed is entirely indistinct, or scarcely perceptible, or it is more or less prominent, like a thread or a cord. In our American species these characters seem pretty reliable, but in the varieties of the Old World Grape-vine (*Vinifera*), several thousands of years removed from their native sources, the form of the seed has also undergone important

* Compare note on page 9.

* A single seed is always thicker, plumper, more rounded ; two seeds are flattened on the inner, rounded on the outer side ; three or four seeds are more slender and angular ; these different variations may often be found in berries of the same bunch.

modifications, and can no longer be considered so safe a guide as in our species.

But different as these seeds are among themselves they have a character in common, which distinguishes them from all our American Grape seeds; their beak is narrower and usually longer, and their large chalaza (the area on the back of the seed) occupies the upper half and not the centre of the seed; in the American species the beak is shorter and more abrupt; the chalaza, usually smaller, and often not circular, but narrower, is placed in the centre of the back. Any one who wishes to satisfy himself of this need only compare a raisin seed with any of our grape seeds, if the following cuts are not plain enough.

The size and weight of the seeds varies greatly in the different species, thus *Labrusca* and *Candicans* have the largest, *Cinerea* and *Riparia* the smallest seeds, but even in the wild state we find variation, e. g., in *Æstivalis*, still more in *Cordifolia*, and most in *Riparia*. In *Vinifera*, the European grape, however, the variations are much greater, greater even some times than our figures show. Some have laid stress on the color of the seeds, which varies between brown and yellowish, but that seems to me to go too far for our purposes.

The cuts of 33 Grape seeds, here represented, illustrate the different characters which have been mentioned above. The figures are magnified four times (four diameters), accompanied by an outline of natural size. They all represent the back of the seed.

Fig. 1 and 2, *Vitis Labrusca*, seeds of wild plants; fig. 1 from the District of Columbia, and fig. 2 from the mountains of East Tennessee. The seeds of the cultivated varieties do not differ from these; they are all large, notched on top: chalaza generally depressed and no raphe is visible in the groove which extends from the chalaza to the notch.

Figs. 3 to 5 represent seeds of cultivated forms, which all show evident signs of hybridity and acknowledge the parentage of *Labrusca* by the form and size of the seed as well as by the irregular arrangement of the tendrils. Fig. 3 is the seed of the Taylor Grape, which stands near *Riparia*. Fig. 4 is the seed of the *Clinton*, which has, perhaps, the same parents. Fig. 5, seed of the *Delaware* Grape, which possibly may be a hybrid of *Labrusca* with *Vinifera*.

Figs. 6 to 8, *Vitis Candicans*; seed similar to those of *Labrusca*, but broader, generally with a shorter beak, and less distinctly notched. Figs. 6 and 7 are from Texas, the latter broader and with a broader beak; fig. 8 comes from South Florida, and is still broader and shorter.

Fig. 9, *Vitis Caribæa*, similar to the last, but smaller; seeds short and thick, and deeply notched.

Figs. 10 and 11, *Vitis Californica*, seeds often smaller, scarcely or not at all notched, raphe indistinct or quite invisible; chalaza narrow and long. Fig. 10 represents a single seed (one only in a berry) from near San Francisco; fig. 11 is one of four seeds from San Bernardino, in Southern California.

Fig. 12. *Vitis Monticola*; seed very similar to those of the last species, thick, notched, without a distinct raphe, and with a long and narrow chalaza.

Figs. 13 and 14, *Vitis Arizonica*, from the Santa Rita Mountains; seeds small, slightly notched, with a more or less distinct but flat raphe.

Figs. 15 to 17, *Vitis Æstivalis*; seeds rather larger, cord-like raphe and more or less circular chalaza strongly developed; all the seeds are from wild grapes gathered about St. Louis; the seeds of the cultivated forms, Northern and Southern, are similar. Figs. 15 and 16 are from berries with only one or two seeds; fig. 17 is narrower, and from a larger four-seeded berry.

Fig. 18, *Vitis Cinerea*, a seed similar to the last, with the same strong raphe, but smaller in size, and often single.

Figs. 19 and 20, *Vitis Cordifolia*; seeds also similar to the two last, but raphe not quite so prominent, mostly single or in twos, rarely more in a berry; fig. 19 comes from a larger berry, with more seeds, found near St. Louis; fig. 20 is a single seed, from the District of Columbia.

Fig. 21, *Vitis Palmata*; seed large, almost globose, with a very short beak, a narrow chalaza, no raphe visible, top slightly depressed.

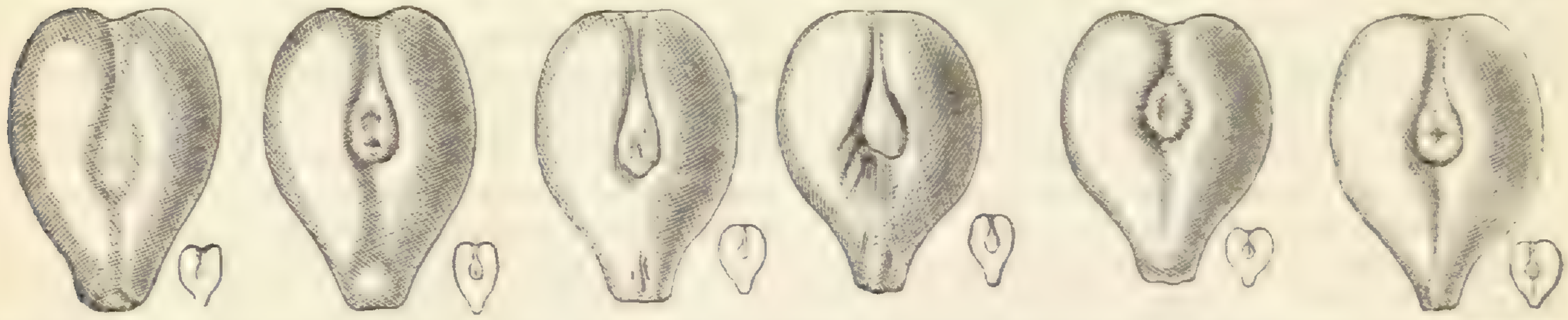
Figs. 22 to 25, *Vitis Riparia*; seeds similar to the last, but smaller, though quite variable in size. The seeds all come from wild plants; figs. 22 and 23, from Goat Island on the Niagara Falls; fig. 22 a single broad seed; fig. 23 from a three-seeded berry; fig. 24 from a two-seeded berry from the shores of Lake Champlain, in Vermont; fig. 25, seed of the June grape from the banks of the Mississippi below St. Louis. The seeds are obtuse, or very slightly depressed on top, chalaza rather flat, elongated and gradually lost in a groove which encloses the scarcely prominent raphe.

Figs. 26 and 27, *Vitis Rupestris*; fig. 26 from a two-seeded berry from Texas, and fig. 27 from a four-seeded one from Missouri. The top of the seed is obtuse, not notched, and the raphe very inconspicuous in the Texan seed, or invisible in that from Missouri.

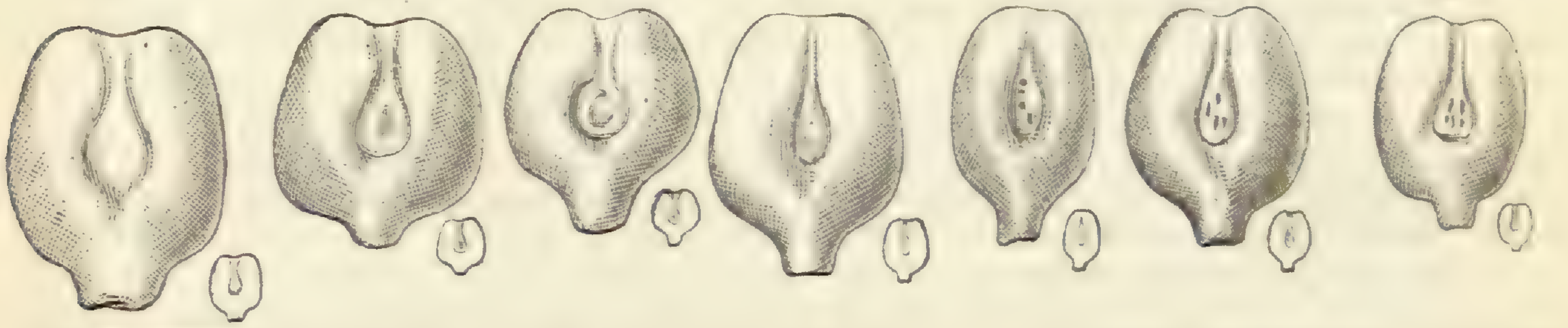
Figs. 28 to 32, *Vitis Vinifera*, from the Old World. Different forms are introduced here for comparison with the American species, and to show how much they differ among themselves. Fig. 28 represents a seed out of a lot of grapes (or raisins) found with an Egyptian mummy, and probably now 3,000 years old, or older. The specimens are preserved in the Egyptian Museum of Berlin. The berry obligingly donated to me was as large as the larger European cultivated grapes, and enclosed three seeds. It will be seen that it is the largest of the *Vinifera* seeds figured here, showing perhaps a slight modification of the seed in the ages that intervened between its and our times.

Fig. 29, *Brusca*, the native species of Tuscany (Northern Italy), fig. 30, *Riesling*, cultivated on the banks of the Rhine; fig. 31, *Gutedel* (*Chasselas*), from the same region; fig. 32, *Black Hamburg*, from a grapery near London. All these seeds are easily distinguished from all American grape seeds, by the narrower and usually longer beak (or lower part), and

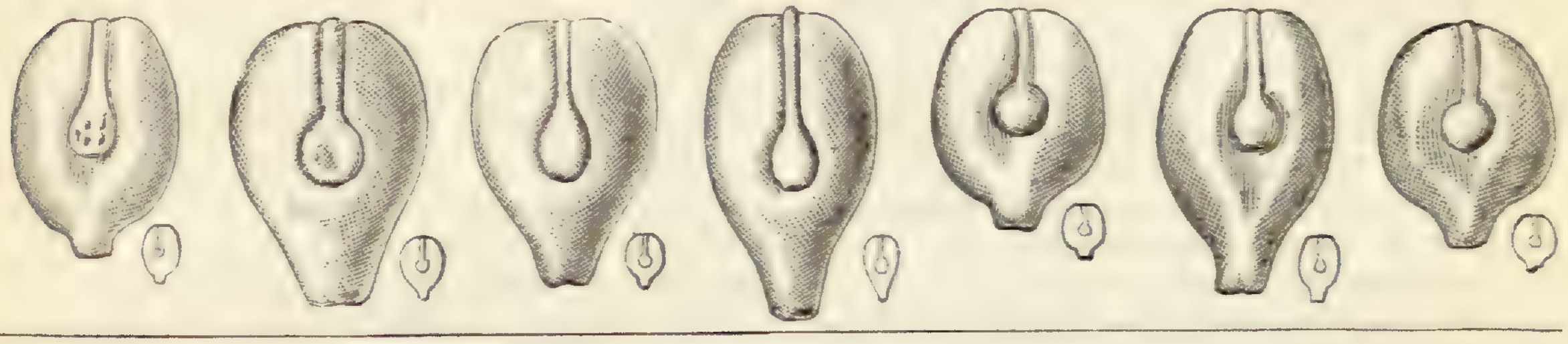
V. LABRUSCA. Fig. 1. Fig. 2. TAYLOR. Fig. 3. CLINTON. Fig. 4. DELAWARE. Fig. 5. V. CANDICANS. Fig. 6.



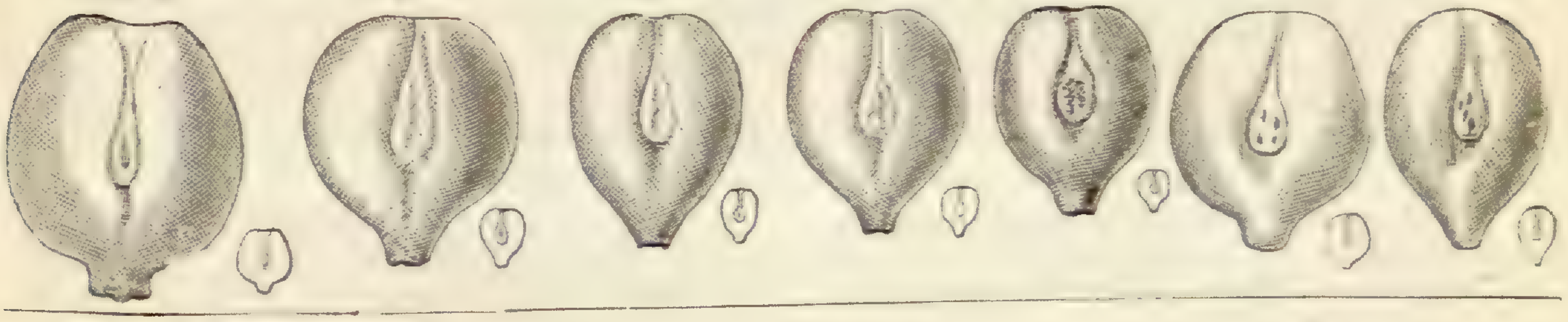
V. CANDICANS. Fig. 7. Fig. 8. V. CARIBEA. Fig. 9. Fig. 10. V. CALIFORNICA. Fig. 11. V. MONTICOLA. Fig. 12. V. ARIZONICA. Fig. 13.



V. ARIZONICA. Fig. 14. Fig. 15. V. ÆSTIVALIS. Fig. 16. Fig. 17. CINEREA. Fig. 18. V. CORDIFOLIA. Fig. 19. Fig. 20.



V. PALMATA. Fig. 21. V. RIPARIA. Fig. 22. Fig. 23. V. RIPARIA. Fig. 24. Fig. 25. V. RUPESTRIS. Fig. 26. Fig. 27.



V. VINIFERA. Fig. 28, Mummy Grape. Fig. 29, Brusca. VITIS VINIFERA. Fig. 30, Riesling. Fig. 31, Chasselas. Fig. 32, Bl. Hamb'g. V. VULPINA. Fig. 33.

especially by the large circular, though not very prominent, chalaza, which occupies the upper, and not the middle part of the seed. These five specimen seeds represent the principal forms, but not all European grape seeds entirely agree with them.

Fig. 33, *Vitis Vulpina* (or *Rotundifolia*), from the South Carolina Muscadine grape, different from all other grape seeds, just as the plant differs from all the other Grape-vines; seed very flat, with straight sides, very short beak, wrinkled, or rather folded, on both surfaces, notched on top, with very narrow chalaza and no visible raphe.

The North American Grape-vines may be systematically arranged in the following order:

I. True Grape-vines, with loose, shreddy bark, climbing by the aid of forked tendrils, or sometimes (in No. 12) almost without tendrils.

A. Grape-vines with more or less continuous tendrils.

1. VITIS LABRUSCA, *Linnæus*, the northern Fox grape, the mother of a great many cultivated varieties and hybrids.

B. Grapevines with intermittent tendrils.

a. Leaves pubescent or floccose, especially on the under side and when young, often becoming glabrous with age.

* Raphe on seed indistinct.

2. VITIS CANDICANS, *Engelmann.* The Mustang grape of Texas.
3. VITIS CARIBÆA, *De Candolle.* The West India grape; rare in Florida.
4. VITIS CALIFORNICA, *Bentham.* The California grape.
5. VITIS MONTICOLA, *Buckley.* The Mountain grape of West Texas.
6. VITIS ARIZONICA, *Engelmann.* The Arizona grape.

** Raphe on back of seed very conspicuous.

7. VITIS ÆSTIVALIS, *Michaux.* Summer grape of the Middle and Southern States, with several varieties.
8. VITIS CINEREA. *Engelmann.* The Downy grape of the Mississippi Valley.

b. Leaves glabrous, or sometimes short, hairy, especially the ribs beneath: mostly shining.

* Raphe on back of seed conspicuous.

9. VITIS CORDIFOLIA, *Michaux.* Frost grape of the Middle and Southern States.

** Raphe indistinct.

10. VITIS PALMATA, *Vahl.* Red grape of the Mississippi Valley.
11. VITIS RIPARIA. *Michaux.* Riverside grape of the United States and Canada.
12. VITIS RUPESTRIS. *Scheele.* Rock or Sand grape of the Western Mississippi Valley and Texas.

VITIS VINIFERA, *Linnæus.* The Wine-grape of the Old World and California; would find its systematic place here

II. Muscadine grape, with (on the younger branches) firmly adhering bark, which only in the older stems scales off; aerial roots from inclined trunks in damp localities: tendrils intermittent, simple; berries very large (7-10 lines thick), very few in a bunch, easily detaching themselves at maturity; seeds with transverse wrinkles or shallow grooves on both sides.

13. VITIS VULPINA, *Linnæus* (ROTUNDIFOLIA, *Michaux*). The Southern Fox grape or Muscadine.

Rafinesque, Le Conte and others, have in times gone by attempted to distinguish and characterize a good many more species, while on the other hand, Director Regel, of the St. Petersburg botanical garden, has lately tried, rather unnaturally, to contract them and unite them with Old World species. *Vitis vinifera* has resulted according to his views, from the hybridization of several of these species.

I now propose to give a short botanical account of the 13 species enumerated above, leaving to the author of this treatise the task to add the important practical remarks which the subject calls for.

1. VITIS LABRUSCA, Linnæus. Usually not large; climbing over bushes or small trees, occasionally reaching the tops of the highest trees; distinguished from all the other species, as has been stated above, by its continuous tendrils and consequently by its continuous (two to often four or six) clusters of flowers and fruit; stipules middle-sized, about two lines long, or less; leaves large (four to six inches wide), thick, of firm texture, entire or in some forms deeply lobed, very slightly dentate, coated when young with a thick rusty, or sometimes whitish down, which in the wild plant persists on the under side, but almost disappears in the mature leaf of some cultivated varieties; berries large in middle sized, or, in many cultivated forms, rather large bunches, bearing 2 or 3 or even 4 seeds, large, notched, without visible raphe. (See table of seeds, page 13, figs. 1 and 2.)

This species, usually known as the Fox grape, or Northern Fox grape, is a native of the Alleghany Mountains, and of their eastern slope to the sea-coast, from New England to South Carolina, where it prefers wet thickets or granitic soil. Here and there it descends along streams to the western slope of the mountains, but is a stranger to the Mississippi Valley proper.

As the *Labrusca* generally grows on granitic soil or granitic detrities, which may favor the vine, I would suggest to plant Catawba vineyards in the granitic regions of our Ozark Mountains, and would expect favorable results there.

By far the largest number of varieties of Grape-vines now cultivated in our country are the offspring of this species; a few produced by nurserymen, but most of them picked up in the woods; they are easily recognized by the characters above given, and most readily by the peculiar arrangements of the tendrils as above described. Large and downy-leaved varieties of *V. æstivalis* are, in the West and South-west, not rarely mistaken for *Labrusca*,

but the two may always be distinguished by the characters indicated.

It is also the species which has most generally been used as one of the parents (mostly the mother) in artificial hybridization, and as it is the most individualized or specialized of all our (perhaps of *all* known) Grape-vines, its characters unmistakably prevail in the hybrids, and rarely leave a doubt as to where to refer the questionable form; of which I shall have to add a few words below, under the head of *Hybrids*.

2. VITIS CANDICANS, Englemann. (*V. mustangensis*, Buckley.) The Mustang grape of Texas; a tall climber, with rather large, rounded, almost toothless leaves, white cottony on the under side, bearing large berries, which, like those of the wild *Labrusca*, show different colors, greenish, claret and bluish-black; and which, in its native country, are made into wine. In young shoots and sprouts the leaves are usually deeply and elegantly many-lobed, which, with the contrast of the deep green upper and pure white under surface, would make this species a most elegant vine for arbors, if it could be protected from severe frost. This may be done by laying it down and covering it with soil. In Texas it grows in the lower country, as well as on the calcareous hills, and extends even into the granitic region. It has also been found in Florida, where many Texas plants are again met with. The Florida form, at one time taken for Vitis caribæa, but quite distinct from it, has shorter and comparatively thicker seeds. (Fig. 8.)

3. VITIS CARIBÆA, De Candolle, is a West Indian species which has lately found its way, with other tropical plants, into southern Florida. It has a downy, cordate leaf, not lobed, but characterized by the small but very sharp, distant teeth. Its black berries are small and mostly bear but one or two seeds. I find the Florida seeds (fig. 9) which were kindly sent to me by Mr. A. H. Curtiss, the discoverer, larger than those of the West Indian type.

4. VITIS CALIFORNICA, Bentham. The only wild grape of our Pacific coast; a low bush a foot or two high, in dry beds of streams in southern Oregon; it becomes a tall climber in southern California, with a stem 3 inches or more in diameter; it is distinguished by its cordate, rounded, whitish, downy leaves and small black berries in large bunches; the obtuse but scarcely notched seeds (figs. 10 and 11), without or with only a trace of a raphe, and with a narrow, long chalaza. No use is made of this species, but it has lately been recommended as a grafting stock for European vines in California vineyards which have been attacked by the Phylloxera. For even this Grape-vine, which is a native of a country originally entirely free from the insect, is as proof against it as any of our Mississippi Valley vines.

5. VITIS MONTICOLA, Buckley. Usually a small bushy vine, rarely climbing over higher trees; branchlets angled; young stems, petioles and leaves cottony, downy, the down gradually disappearing, remaining only here and there in flocose bunches; stipules very short ($\frac{1}{2}$ line long); leaves deeply cordate, with a rounded sinus, very shortly three-lobed, edged with small but broad teeth, rather wrinkled on the upper surface, but the older ones very smooth and often conspicuously shining below (especially in the dry specimens); usually small, not more than three inches across, only on vigorous shoots three or four inches wide; tendrils intermittent, in the smaller, bushy forms, often withering away; bunches of fruit compact, short; berries 4, or rarely 5 lines in diameter; seeds obtuse or slightly notched. chalaza rather narrow, extending upward into a broad groove, but without a visible raphe.

This is one of the smaller species and is peculiar to the hilly, cretaceous region of western Texas, not extending to the lower country nor to the granitic mountains; common about San Antonio, New Braunfels, Austin, etc.; also occasionally cultivated about San Antonio, when the bunches, as well as the berries, become larger. This plant has given rise to a great deal of speculation and controversy. About fifty years ago, the Swiss botanist, Berlandier, collected it in West Texas,* but it was not till twenty-five or thirty years later that Prof. Buckley named and published it. Unfortunately his description was so insufficient that no botanist could recognize the plant; only the Texans of those regions, who well knew "the little mountain grape," understood what he meant. Buckley's mention of a middle sized green, very palatable berry has misled French botanists to look for this plant among the numerous forms of *Labrusca*, and Prof. Planchon therefore changed the name to *Vitis Berlandieri*. In justification of Buckley's description it is now said that there exists a form of this species, especially about Fredericksburg and on the borders of the Llano Estacado, with somewhat larger, green berries, which I understand Mr. J. Meusebach is trying to find out,

* On his specimens I found the first Phylloxera galls, which, thus accidentally preserved, prove the existence of the insect in America (doubted, however, by no one now) long before it became known to science here or in the Old World, and also prove its existence as far south as Texas.

and to introduce into cultivation. The species will readily grow from cuttings.

6. VITIS ARIZONICA, Engelmann, is closely related to the last, and has similar seeds, but the flat raphe, though rarely prominent, is broad and sometimes inconspicuous; branchlets angular; leaves cordate, with a rather open, rounded sinus, not lobed, or with two short latent lobes; floccose, cottony when young; glabrous, thick, very rigid, and (especially on the upper surface) rough, when older; berries small or middle sized, reported to be of luscious taste.

7. VITIS ÆSTIVALIS, Michaux. Climbing over bushes and small trees by the aid of forked, intermittent tendrils; branchlets rounded, bark of the mature ones mostly red, and scaling off in large flakes; leaves large (4–5 or 6 inches wide), of firm texture, entire, or often more or less deeply and obtusely 3–5 lobed, with rounded sinus and with short and broad teeth; when young always very woolly or cottony, mostly bright red or rusty; at last smoothish but dull, pale or glaucous beneath, and never shining; stipules very short and rounded, mostly rusty-downy; berries middle-sized, black, 5–7 lines, in Southwestern forms even 8–9 lines in diameter, coated with a bloom, when well grown in compact, often cylindrical bunches; seeds rather large, mostly two or three in each berry, rounded on top, showing a very prominent, cord-like raphe, and more gradually attenuated into the beak than is common in our species.

This is the well known summer grape, common throughout the Middle and Southern States, usually found on uplands and in dry, open woods or thickets, maturing its fruits in September. It is one of the most variable of our Grape-vines, and hence has seduced many into the establishment of numerous nominal species, while others, and among them myself, have assumed too wide limits for the species, and have classed under it forms which now, since we know them better, have to be kept separate. Among the latter I mention *V. monticola* and *V. cinerea*, which are described in their proper places. Among the former I must still retain with *V. æstivalis* the form that had been distinguished by Buckley as *V. lincecumi*. This latter, often more bushy than climbing, has larger berries, leaves often deeply three-to-five lobed, and coated with a thick rusty down, or tomentum, which is often quite persistent. Forms with very large, woolly leaves have often been taken for *Labrusca*, and this species, abounding in the sandy post-oak (Quercus stellata) woods of Eastern Texas, and there known under the name of Post-oak grape or Sand grape, but extending also to Arkansas and Missouri, has thus been quoted for the Western and Southwestern States, to which the true *Labrusca* is an entire stranger.

This species is one of the most important ones for us, and in the West at least, has already taken the place once accorded to the Labrusca forms in our cultures, not only for their greater, aye absolute, resistance to the Phylloxera, but also for their intrinsic value as wine (and even table) grapes, notwithstanding the superior size of the Labrusca berries. Unfortunately the typical forms cannot be propagated by cuttings, and there are a number of varieties which, originating from a Southern home, are not quite hardy here, but, on the other hand, have the advantage of being readily propagated by slips, in some favorable localities. Their leaves are thinner than those of our type, and woolly only in the first youth; the bunches are larger, more shouldered; the berries, though small, are much sweeter and more juicy. They comprise among others the *Cunningham*, with less divided, and the *Herbemont* and the *Lenoir* with deeply lobed leaves, the two former with lighter colored, the latter with deep black berries. Unfortunately no wild plant from which these varieties might have sprung is yet known, but must be looked for in the mountains or hills of the Carolinas and Georgia, and only when found in a wild state can we correctly judge of their botanical status. About their viticultural relations, the body of this work has to be consulted. I will only state here that a slight suspicion exists of their being hybrids between *V. æstivalis* and some form of *vinifera*, though the seeds are entirely those of the former, and also the resistance to Phylloxera. The variety *Lenoir*, often named *Jaquez*, and in Texas *Black Spanish*, has been introduced by millions into Southern France, and is there found to furnish not only an excellent stock whereon to graft their own vines, but also to make a superior wine directly, and one very rich in the deep coloring matter so highly prized there.

8. VITIS CINEREA, Engelm., closely allied to *Æstivalis*, with which I had formerly united it as a variety, of pretty much the same size, rarely taller. It is distinguished by its whiteish or grayish pubescence, which, especially on the branchlets, is quite persistent, even into winter; by the angular branchlets, the hair being especially developed on the angles; the cordate often entire, or slightly three-lobed, more or less gray-downy leaves, which

often resemble a Lindenleaf, with a rounded but usually rather narrow sinus; by the large, loose inflorescence, which opens its flowers rather later than any other of our species; by the small black berries, about four lines in diameter, without a bloom, of a pleasantly acid taste, until frost sweetens them, and by the small, plump seed with a short beak.

This species is found in rich soil in the Mississippi Valley from Central Illinois to Louisiana and Texas, especially in bottom lands and along the banks of lakes, in situations where we scarcely ever meet with *Æstivalis*. It is quite abundant in such localities near St. Louis.

9. VITIS CORDIFOLIA, Michaux. This is the tallest of our climbers at home in our deep bottom woods, but often also a low trailer over bushes and hedges, well known as the Winter, or Frost grape, flowering late and maturing late its strongly flavored, shining black berries.

The plant is glabrous, or the branchlets and lower surface of leaves somewhat hairy; branchlets indistinctly angular (in this respect intermediate between the last two species); diaphragm at the nodes of the branches thick, rarely, at the lower nodes, wanting; leaves rather large, three to four inches wide, or more, not lobed at all, or slightly three-lobed, cordate, with a deep narrow, or wider, but always sharp sinus, margined with conspicuous, rather large sharp-pointed teeth; stipules short; flowers in large, usually loose clusters, blooming rather late; berries small (three to four lines through), black and shining, with a peculiarly disagreable and strong flavor; edible only after frost; seed, with slight or strong raphe.

A common plant from the Middle States southward to Texas; not known, I believe, in northern New York or New England, but not rare in Pennsylvania and New Jersey, and found also near the city of New York; very common in the deep soil of the western river valleys, where it takes its fullest development. There the trunk sometimes reaches thirty to thirty-eight inches in circumference (southern Missouri, along the Iron Mountain Railroad); whether the trunk found by Mr. Ravenel at Darien, Georgia, measuring forty-four inches around, belongs to this species, I cannot tell, but his supposition that it was *Æstivalis* is quite improbable; the statement of newspapers that a Grape-vine in Gulf Hammock, in Florida, had a circumference of sixty-nine inches, is considered a "fish story" by Florida botanists.

The acute, mostly narrow sinus of the leaves, the small stipules, the broad diaphragms, the character of the seeds, the circumstance that it don't grow from cuttings, and the late flowering time, abundantly distinguish this species from *Vitis riparia*, with which it has been thrown together so long and so obstinately.

10. VITIS PALMATA, Vahl, has been cultivated in the Jardin des Plantes in Paris for perhaps one hundred years or more, and has thence found its way into other European gardens, without, however, as it seems, having attracted the attention of botanists, since its first publication, in 1794.

Vahl's description is accurate enough, with the exception of its native country, which he gives as "Virginia," a negligence or ignorance which we must not criticise too severely in botanists of a century ago. The seed was originally brought to Paris probably by French missionaries, who, as is well known, roamed about in the Mississippi Valley one and two hundred years ago. Soon after the publication of Vahl's description of this grape, above mentioned, Michaux discovered this interesting species "growing abundantly on the banks of the streams in Illinois," and named it *V. rubra*. He don't seem to have recognized the vine which he might have seen growing under his eyes in Paris, and eventually he merged his specimens of this Vitis in his herbarium under *V. riparia*.

Last fall Mr. H. Eggert, of St. Louis, re-discovered this long neglected plant on the banks of the Mississippi, opposite Alton, and collected it there again this summer, when it proved to be the latest blooming of all our species (far from blooming yet to-day, June 10th). There can be no doubt of the identity of this plant with Vahl's *V. palmata* and Michaux's *Rubra*, nor of its entire distinctness from *Riparia*. It is found, with this last one, covering willow thickets and other bushes in low grounds, overflowed during high water. Its bright red branches, from which the bark separates in large flakes, conspicuous between the smooth but dull, darkish foliage (much darker than *Riparia*), show at once how appropriate Michaux's name is. The diaphragms are thick. The leaves have a broad sinus, and are shallow or often deeply three, rarely five, lobed, the lobes usually drawn out into long and slender points; the under side is often somewhat hairy along the nerves; stipules middle sized, 1½ to 2 lines long; flower bunches large and loose, on long stems; berries rather small (4–5 lines through), black, without bloom; seeds one or two, very large and plump, rounded, with very short beak, notched on top, without a visible raphe.

Our plant is readily distinguished from *Riparia* by the thick diaphragm, the red branches, its late flowering and its bloomless, late ripening berries; from *Cordifolia* the form of the leaves and of the seeds, and its ready growth from cuttings, easily separate it.

11. VITIS RIPARIA, Michaux, the Grape-vine of the river banks, has lately acquired a great deal of importance, as it has now become the principal Grape-vine relied on in France for the renovation of their failing vineyards, for which its vigorous growth, adapted to almost all climates, its perfect resistance to the insect, its easy growth from cuttings, and its ready taking of grafts, seem to peculiarly fit it.

This species climbs over bushes and small trees, or trails over the rocks on our river banks. It is also found inland, always near water, on larger trees, where its trunk may become six inches thick. The branchlets are rounded, not angled; the diaphragms very thin ($\frac{1}{8}$ to $\frac{1}{4}$ line thick); the stipules large (2–3 lines long) and very thin, and persist longer than in most other species; leaves of a light green, shining, glabrous or often hairy below, with a wide, rounded, or even truncate sinus; they are more or less tri-lobed, margined with large, sharp-pointed teeth. The bunches are mostly small and compact; berries small (four or rarely five lines in diameter), black, with a bloom, sweet and very juicy, scarcely pulpy; seeds (figs. 22 to 25) obtuse or slightly notched, with a narrow chalaza, raphe indistinct or very thin.*

It has the widest geographical distribution of any of our Grape-vines, and is the hardiest of them all. It extends northward to Lake St. Jean, ninety miles north of Quebec, and to the banks of the Upper Mississippi in Minnesota, and the shores of Lake Superior; in the South it is common on the banks of the Ohio and in Kentucky, Illinois, Missouri and Arkansas,† and in the Indian Territory. I have not seen it from Louisiana or Texas, but a form of it is found in the Rocky Mountains of Colorado and New Mexico, and perhaps in southern Utah. It is the earliest flowering species about St. Louis, according to season, between April 25th and May 15th, and matures earlier than any other. In St. Louis it used to be brought to market, before we had cultivated grapes, sometimes as early as July 1st, from the rocky, sun-exposed banks of the river below town, and was, indeed, known as the "June Grape." From that time on ripe fruit is found, according to locality, through August and September. It is singular that our vintners, as far as I can learn, have never made wine from this species, nor tried to cultivate and improve it. The berries probably seem too small, and they may have expected better results from the larger fruits of *Æstivalis*; but the experiment might yet be made, and our woods might be examined for larger-fruited varieties, which really do occur, e. g., along the Lakes and on Niagara, near Detroit, etc.

As has been stated above, this species has been confounded with *Vitis cordifolia*, to which indeed, it bears a certain resemblance; but the characters enumerated, especially those of the diaphragms, the stipules, the form of the leaf and its base, its flowering time, and above all the seeds, distinguish them as well as any two species can be distinguished, even if the difficulty of one and the readiness of the other to grow from cuttings be not taken into account.

12. VITIS RUPESTRIS, Scheele, mostly a low, bushy plant, often without any, or with weak, deciduous tendrils, and not climbing, under favorable circumstances becoming stouter and climbing pretty high; branchlets rounded, diaphragm thicker than in *Riparia*, but thinner than in other species; leaves rather small (about three inches wide), broadly cordate, rarely very slightly lobed, mostly broader than long, usually somewhat folded together, with broad, coarse teeth, and commonly with an abruptly elongated point, glabrous, shining, of a very pale green color; stipules almost as large as in last species, 2–2½ lines long, thin; berries small or middle-sized, sweet, and in very small bunches; seeds obtuse, with a slender or almost invisible raphe.

This Grape-vine, of very peculiar aspect, is a native of the hilly country west of the Mississippi river, from the banks of the Missouri to Texas, and is also found on the Cumberland river near Nashville; its favorable localities are gravelly banks or bars of mountain streams, overflowed in spring, more rarely (in Texas)

* The French now distinguish several types of Riparia, differing somewhat in their minor characteristics. See our Viticultural Remarks.

† A peculiar form of *Riparia* is a plant which I found fifteen years ago in the botanic garden of Berlin, under the name of *Vitis Solonis*, and about the history of which nobody seems to have known any thing. Lately this plant has been taken up in France with that zeal so characteristic to that nation, as something possibly of particular interest for their viticultural pursuits. It is distinguished from the ordinary form by the long and narrow, almost incised, crowded teeth of the scarcely three-lobed leaves. The name is undoubtedly a corruption of "Long's," and the plant comes from the Upper Arkansas river, where Major Long, on his return from his expedition to the Rocky Mountains, found, as he reports, such excellent grapes. Seeds may have been brought home and the plant raised as "*Long's*." A manuscript of the viticulturist Bronner, preserved in the Carlsruhe library, speaks of a certain grape-vine as "*Longs, from Arkansas*," and it is reported that *Long's* is still growing in the late Mr. Bronner's garden at Wisloch, near Heidelberg, and that it is identical with *Solonis*. As an example of curious speculative interpretation it may be stated that some viticulturist had read *Solonis* for *Zanis* (an oriental grape), and *Arkansas* for *Caucasus*.

on rocky plains. In Missouri it is called Sand grape, in Texas often, on account of its luscious fruit, Sugar grape; with us it flowers soon after Raparia and ripens in August, and is said to make a good wine. In France the *V. Rupestris* is used, like the last species, as a grafting stock for French vines; it grows easily from cuttings, and is said to make vigorous plants, perfectly resistant to the insect.

VITIS VINIFERA, Linnæus. Here would be the place to introduce the Grape-vine of the Old World, as it is most nearly allied to the last enumerated species, especially to *V. riparia*. Though many of its cultivated varieties bear berries as large, or even larger, than those of any of our American Grape-vines, other cultivated forms, and especially the true wine-grapes, those from which the best wines are obtained, and also the wild or naturalized ones, have fruit not much larger than that of the above named native species.

This plant, together with the wheat, belongs to those earliest acquisitions of cultivation, the history of which reaches beyond the most ancient written records. Not only have the sepulchres of the mummies of ancient Egypt preserved us its fruit (large sized berries) and seed, but its seeds have even been discovered in the lacustrian habitations of Northern Italy. It is a mooted question where to look for the native country of this plant, and whether or not we owe the different varieties of our present *Vinifera* to one or to several countries, and to one or to several original wild species, which, by cultivation through uncounted ages, and by accidental and repeated hybridization, may have produced the numberless forms now known. These remind us forcibly of the numerous forms of our dog, which we cannot trace, either, but which can scarcely be derived from a single (supposed) original wild species. Director Regel, of St. Petersburg, ascribes them to the intermingling of a few species, well known in their wild state at this day. The late Prof. Braun, of Berlin, suggested that they are the offspring of distinct species yet found wild in many parts of Southern Europe and Asia, which thus he considered not the accidental offspring of the cultivated plants, as is generally believed, but the original parent stock. I may add, from my own investigations, that the Grape-vine which inhabits the native forests of th low banks of the Danube, "bottom-woods," as we would call them, from Vienna down into Hungary, well represents our *V. cordifolia*, with its stems three, six and nine inches thick, and climbing on the highest trees, its smooth and shining, scarcely lobed leaves, and its small, black berries. On the other hand, the wild grape of the thickets of the hilly countries of Tuscany and Rome, with its lower growth, somewhat cottony leaves, and larger and more palatable fruit, which "don't make a bad wine," as an Italian botanist expressed himself to me, reminds us, notwithstanding the smaller size of the leaves, of the downy forms of *Riparia*, or perhaps of some *Æstivalis*. It was known to the ancients as *Labrusca*, a name improperly applied by science to an American species, and is called by the natives to this day *Brusca*. The Grape-vines of the countries south of the Caucasus Mountains, the ancient Colchis, the reputed original home of these plants, greatly resemble the Italian plant just described.

The European Grape-vine is characterized by smoothish, and, when young, shining, more or less deeply, five or even seven-lobed leaves; lobes pointed and sharply toothed; seeds mostly notched at the upper end; beak elongated; raphe indistinct; chalaza broad, high up the seed. In some varieties the leaves and branchlets are hairy and even downy when young; the seeds vary considerably in thickness and length, less so in the shape of the raphe. It is well known that the plant grows readily from cuttings, and that it easily and almost invariably succumbs to the attacks of the Phylloxera, which, accidentally introduced into France, probably with American vines, has done such immense damage in that country and in the rest of Europe, probably since 1863 (though only discovered as the virulent enemy in 1868), and is spreading more and more. In California, where thus far the *Vinifera* has been successfully cultivated, the insect also begins to make its appearance in some localities. That it was the cause of the complete failure in all the efforts to plant the European vine east of the Rocky Mountains, is now well known.

13. VITIS VULPINA, Linnæus (known also as *V. rotundifolia*, Michaux), the *Southern Fox grape*, *Bullace* or *Bullit grape*, or *Muscadine* of the Southern States, is entirely different from all our other Grape-vines, and is mentioned here only to complete the list of our species. It is too tender for our climate, and never flowers or fruits here. It is found in damp thickets or on mountain slopes, sometimes a low bush, and again climbing very high, with entire, never forked, tendrils; branchlets without any diaphragm (see fig. 37); leaves small (two, or at most, three inches wide), rounded, heart-shaped, firm and glossy, dark green, smooth, or rarely slightly hairy beneath, with coarse and large or broad and bluntish teeth. The bunches are very small, of few very large berries, which fall off singly, like plums. The peculiar seed has been figured and described above (page 13, fig. 33). In the South some of the varieties are highly esteemed, especially the White Scuppernong.

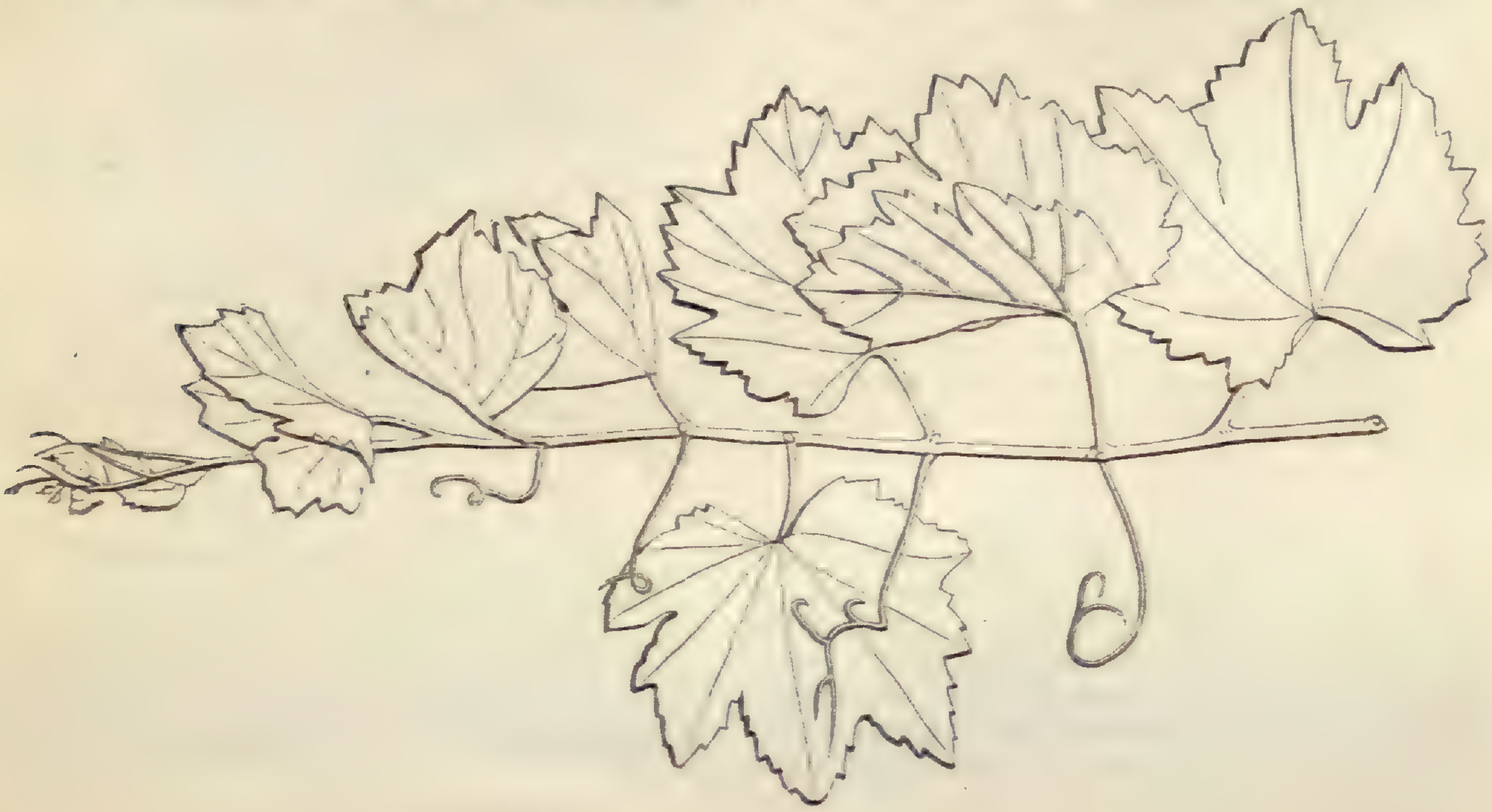
HYBRIDITY.

Plants, which are so intimately related among themselves, are apt to hybridize, and their offspring is usually fertile, not like many hybrid animals (the mule) or plants incapable to propagate. We have a number of artificial hybrids among Grape-vines, whose history is well known, and which bear as well as the true species, and their seeds are fertile. But we also find other vines in the woods or in vineyards, which, from their characters, we must conclude to be spontaneous hybrids. There is, of course, a good deal of experience and judgment necessary to decide what may be

justly claimed to be a hybrid, and what only a variety within the limits of some variable species, and the opinions of different persons may honestly vary on these points. But whoever has studied the great variability of many plants will hesitate long before he calls to his aid the often fanciful help of hybridity in the explanation of doubtful forms. Where species are so well marked as e. g. *Labrusca* is, it is not difficult to recognize some of its characters in a hybrid off-spring, though the general looks of the questionable plant otherwise may not conform to our idea of *Labrusca* at all; but in other cases, where species already stand near one another, the matter becomes much more difficult. But there is another way, unfortunately a very tedious one, to assist in such investigations, viz: to sow the seeds of hybrids and study their offspring; for it is a fact that seedlings of hybrids are apt to revert to, or at least to approach to, one or the other of the parents. One of the most striking examples of both positions here taken is furnished by the well-known Taylor or Bullit grape. The vigorous growth of this form, its thin diaphragms, its glossy, glabrous foliage, its small clusters of rather small berries entirely destitute of foxy taste, all seem to point to it as a cultivated variety of *Riparia;* but when we come to examine the tendrils we find that they are irregular; sometimes intermittent, sometimes more or less continuous (I have seen six in succession, which can only point to *Labrusca*), and just so the seeds differ from *Riparia* seeds by their great size and their form (see page 13, fig. 3). Now it so happens that Taylor seeds have been planted by the million in Europe, in order to raise resistant stock for grafting, and the general experience is that one cannot find two seedlings in a hundred alike, and similar to the mother-plant; some approach the *Riparia* type, and others show the *Labrusca* parentage distinctly. Thus, to give only one example, one of such seedlings—the now frequently cultivated *Elvira*—is a Taylor seedling with a close approach to *Labrusca*.

It would further the study of our Grapevines considera bly if some of those that have the zeal, the leisure and the opportunity, would institute such experiments with doubtful forms.

Pursuing this in teresting subject further, I may add that where nearly allied species grow near together, and bloom about the same time, they are more likely to hybridize than such species that are separated by wide space or different period of flowering. With all these considerations we must not forget that with the innumerable opportunities given every where for hybridization we find comparatively so few spontaneous hybrids in the vegetable world. Hybridization is an abnormal, I may say, an unnatural process, which is usually prevented by countless obstacles. If it were not so, we would meet with more hybrids in our woods and prairies than with genuine species; but how rare are they, and what a find it is for a botanist to discover one! And this is the more to be wondered at, because the genital organs of the plants, though mostly united in one flower, are usually so organized that self-fertilization is made difficult, or is excluded, and that cross-fertilization is the rule. We may put it down as a law that honest nature abhors hybridization.



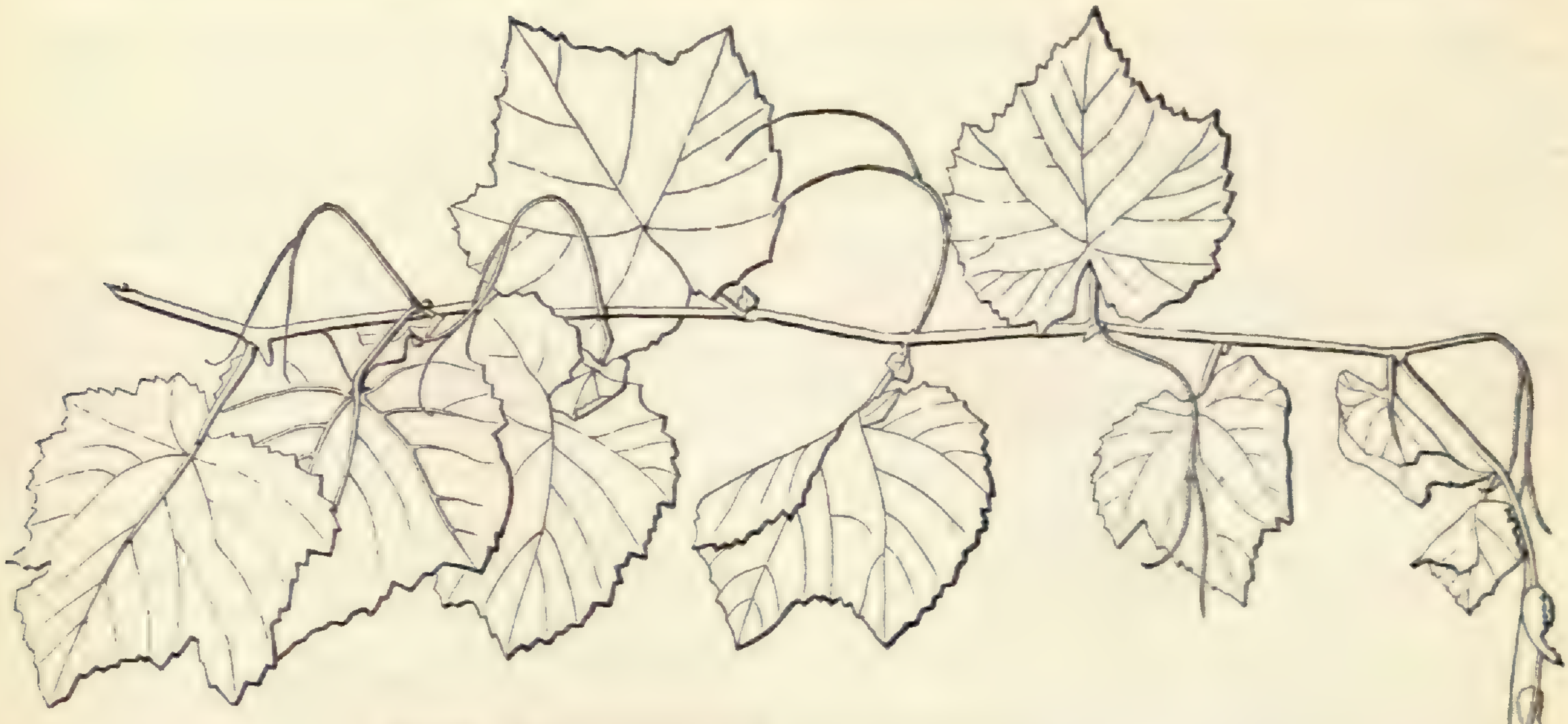


Fig. 39. ÆSTIVALIS FOLIAGE. (Cunningham.)

VITICULTURAL REMARKS

ON OUR AMERICAN SPECIES, WITH LISTS OF THEIR CULTIVATED VARIETIES.

The varieties which we cultivate in this country, east of the Rocky Mountains, and over in Europe, under the name of *American Grapes*, all belong to either one or other of the following five species:

(1) VITIS LABRUSCA, (7) V. ÆSTIVALIS,
(11) V. RIPARIA, (12) V. RUPESTRIS, and
(13) V. VULPINA or ROTUNDIFOLIA,

or are HYBRIDS (crosses between these or with *Vitis vinifera*).

While a study of the preceding treatise, by Dr. G. Engelmann, is sufficient to enable every careful observer, and especially the botanist, to distinguish them, the following "viticultural remarks," with lists of varieties for each species, and containing observations of practical grape-culturists, may assist in that important study and may prove of some value.

V. LABRUSCA, the species of which the largest number of our cultivated varieties and those most extensively cultivated in our country are the offspring, is still the most limited local species, its home being confined to the region between the Atlantic Ocean and the Alleghany Mountains.

Dr. Engelmann desires local botanists to assist in more accurately defining the geographical limits of our species of Vitis; but there is no doubt about the wild Labrusca being unknown in the Mississippi Valley. "Whatever has been called so there, or in Louisiana or Texas, is a large and downy-leaved form of *Æstivalis*, always readily distinguished by its '*intermittent*' tendrils, while Labrusca has more or less '*continuous*' tendrils." (Compare Figs. 39 and 42.)

"For *table* use, this species, in its improved varieties, will probably always occupy a prominent position in a large portion of the Eastern and Northern States as well as in the northern sections of the Western States; and in those regions where the climate will not favor the maturity of the best varieties of this class, the inferior kinds will occupy their place."

"As a wine grape the *V. Labrusca* has been over-estimated; the tough, musky pulp of even the best varieties requires a long and favorable season of growth to reduce the acid center so as to produce a proper ratio of the ingredients necessary for a passable quality of wine."

Fully endorsing the above quoted views of William Saunders, Superintendent of the Experimental Gardens at Washington, we do not wish to be understood as advocating the discontinuance of planting and using Labrusca grapes for wine-making: we are well aware that the Catawba and Concord still furnish the bulk of our most popular wines. But for wines of finest quality we recommend the Æstivalis, where its varieties succeed, as far superior to the Labrusca. Moreover, we recognize in this species a Northern and a Southern form (same as in the Riparia and Æstivalis), with distinct characteristics.

The *Northern* Labrusca—a plant of great vigor, hardiness and productiveness; abundant, heavy, branching and fibrous *roots*, thick pith, and firm liber; with a fruit of superior size, but also of a disagreeable roughness and foxiness in taste or flavor. In some of its new cultivated varieties, however, this foxiness has become less marked, and is far from disagreeable.

The *Southern* Labrusca—a far more tender plant, very sensitive to casualties from unfavorable atmospheric changes of climate, with few and feeble *roots*, of only moderately firm texture; but also with a much more delicate fruit of an agreeable musky flavor. The first will not do well at the South-west, the second will be found subject to fungoid and other diseases, and will not ripen well at the North, except under the beneficial influences of large lakes, or in some peculiar, well-protected localities and favorable seasons.

Both are subject to rot, and do not continue to thrive well in those parts of the country where both types of Labrusca do not seem to feel at home.*

* G. Onderdonk writes us: "After all, *our* grapes in Texas must come from the Æstivalis family. No *Labrusca* has given us good, permanent satisfaction here." This same view is obtaining ground in Arkansas and south-west Missouri, after full trial and dearly-bought experience.

The principal varieties of this species, thus classified, are:

[*a*] *Northern Group.*	[*b*] *Southern Group.*
BLACK HAWK,	ADIRONDAC,
CONCORD,	CASSADY,
COTTAGE,	CATAWBA,
DRACUT AMBER,	DIANA,
EARLY VICTOR (new),	IONA,
HARTFORD PROLIFIC,	ISABELLA,
IVES,	ISRAELLA,
LADY,	LYDIA,
MARTHA,	MAXATAWNY,
MOORE'S EARLY,	MILES,
NORTHERN MUSCADINE,	MOTTLED,
PERKINS,	PRENTISS (new),
RENTZ,	REBECCA,
TELEGRAPH,	TO-KALON,
VENANGO,	UNION VILLAGE.
VERGENNES (new),	
WORDEN'S.	

This subdivision of Labrusca into a northern and southern form is a new idea of our own, and may be a mistake. It was presented for the first time in our Catalogue, not as an established fact, already accepted or endorsed by any botanical authority, but as an hypothesis worthy of consideration and further research. In some few varieties (Creveling, North Carolina, &c.) we as yet find it difficult to determine to which group they should be assigned; but this difficulty also exists in some with regard to the species.

The large size of the fruit, the vigor and productiveness of the vine, and its easy propagation from cuttings, made the varieties of this species preferable to others for hybridizing with European grapes; and it was expected to thereby ameliorate, if not to remove, their foxiness. While this improvement in flavor has been thus accomplished, the process has diminished the hardiness and has increased the sensitiveness to climate and to fungoid diseases in the varieties thus produced. It has proven far more successful to grow seedlings from pure Labrusca varieties, selecting the best, as in Early Victor, Pocklington, &c., or seedlings from crosses between the coarser and more tender varieties of this species, as the Niagara (cross between Concord and Cassady), the Jefferson (cross between Concord and Iona). Moreover the much decried "foxy taste" becomes much less objectionable by habit. Lovers of the Concord and of the Catawba find the Chasselas insipid, and even Europeans learn to eat the foxy grape with pleasure.

The hardy varieties of the *Labrusca* are also excellent as a grafting-stock for its own tender varieties, and for those of the Vinifera, in locations suitable to this species. They were largely imported for this purpose into southern France, but in some localities there they did not prosper: the conditions of soil and climate did not suit them, and were far more suitable to the *Riparia*; hence it was supposed by some, and soon repeated by others, both grape-culturists and botanists, that the *Labrusca*, though exhibiting a larger degree of resistance than the V. Vinifera, suffers from the insect (the Phylloxera). This, however, is incorrect. Even the most tender Labr. varieties, whose enfeebled roots, caused by their mildew-diseased tops, look as if destroyed by the insect, revive during favorable seasons and again become vigorous and fruitful—as no Phylloxera-infested vine ever does. We have seen very fine and healthy Catawba and Isabella vines in full bearing, in phylloxera-infested localities of France. We could quote hundreds of testimonials proving our position. For want of space let the following suffice:

From the official report of the Commission on American Vines—signed by *MM. Lespiault*, Pres't; *Piola*, Vice Pres't; *Lafite*, Sec.; and by such members, well known in the scientific world, as *Millardet*, *Skavinski*, *Debruck*, &c.—to the International Phylloxeric Congress, held at Bordeaux, Oct., 1882.

"It is almost useless to insist on the resistance of the American vines. It cannot any longer be contested. Everywhere the proofs thereof are numerous. While the French vines succumb, the American vines, planted from 10 to 15 years ago, present a vegetation of perfect health. Even the LABRUSCA, reputed as less resistant—the *Concord*, for instance—are still largely cultivated by certain wine-growers, MM. Guirand, Moline, Lugot, the Duchess of Fitz-James, &c., who are well satisfied with them."

VITIS ÆSTIVALIS.—This species is preëminently the WINE grape of the South Atlantic States, and of the lower Mississippi Valley and Texas. Owing to the fact that none of the varieties except the *Elsinburgh* and *Eumelan* will ripen north of the parallel of 40°, unless it may be in some peculiarly favored situation,* they have not been extensively planted, and their superior qualities are but little known. The berries are destitute of pulp, and the juice contains a larger percentage of sugar than any other improved American species. The foliage is not so liable to disease as that of the fox grape, and in the berries rot is also less prevailing, while in some varieties of this class, as Norton's Va. and Cynthiana, it is comparatively unknown. Some of the best wines made in this country are produced from varieties of this family. "Requiring a long season and genial climate for their perfection, they have not yet been extended so widely as the varieties of *Vitis Labrusca*. Their range of successful growth not reaching into high latitudes, their culture has been limited,"—excepting *Norton's* Va. Seedling, of which hundreds of acres are now planted around Gordonsville and Charlotteville, Va.—"I am convinced that neither the wine-producing capabilities of the country nor the highest excellence of the product can be decided until vineyards of these varieties are established in the best locations of favorable climates."—*Wm. Saunders.*

"The most genial home of this species is the country of the Ozark hills, Missouri, S. Kansas, Arkansas, Texas and Indian Territory; probably also the mountain slopes in Virginia, North Carolina, and Tennessee. And these must be looked upon as the great producing regions of this continent, east of the Rocky Mountains, for a certain class of *fine wines*. In *western Texas*, also, the varieties belonging to this class seem 'to succeed better than any other class of grapes,'

* Their proper climate is south of the isotherm of 70° Fahrenheit for June, July, August and September: they require a longer season to attain maturity. The more tender varieties may be properly placed between the isothermal lines of 70° and 75°. [Isothermal lines denote localities of equal mean temperature, and, by careful observation, have been delineated upon maps indicating the various belts of climate, the limits where certain important plants thrive, by far more accurately than by zones and geographical degrees. The latter have long been in vogue, but have really no place in nature.]

though we have never yet seen, or heard of either, an undoubted Æstivalis (wild) or a Labrusca in our part of Texas (S. W.)"—*G. Onderdonk, Victoria, Texas.*

The following varieties of this most valuable species (omitting new untried and discarded varieties) are now cultivated:

Northern Group.	*Southern Group.*
CYNTHIANA,	CUNNINGHAM (Long),
ELSINBURG,	DEVEREUX (Black July),
EUMELAN,	HERBEMONT (Warren),
HERMANN,	LENOIR (Jaquez),
NORTON'S VIRGINIA,	LOUISIANA or RULANDER(?)

(Several new varieties of this species, some chance seedlings selected in the forests of Arkansas, others raised from seeds of cultivated varieties, are on trial.)

The *quality* of these varieties is so excellent that even the French taste seems quite satisfied. Only their *size* is unsatisfactory. "Dans ce group se trouvent les raisins dont le goût se rapproche le plus des nôtres, et qui donnent des vins colorés, corsés, à bouquet souvent delicat, et en tout cas non foxé."—*J. E. Planchon, Les Vignes americaines.*

Mr. Herman Jaeger, of Neosho, south-west Missouri, writes us: "In south-west Missouri, southern Illinois, Arkansas, western Texas, (also in Tennessee and Alabama,) the Labrusca, or Fox grapes, bring two healthy crops of fine grapes, and of the most vigorous varieties, with proper culture and favorable seasons, a few more; then they rot to such an extent that they are entirely worthless. The Æstivalis never rots, and is the only truly reliable grape for these States. It was believed that no *large* summer grapes were existing—but this is a mistake; summer grapes (Æstivalis), nearly of the size of Concord, are found growing wild in Arkansas, and I am confident that superior table grapes will be obtained from their seed. The wild large Æstivalis are not as juicy nor as aromatic as the small; but by crossing the one with the other we may obtain *large* grapes for the south-west as juicy as Herbemont, and as healthy, vigorous and productive as Norton's Virginia, as free from rot and mildew as no Labrusca ever will be with us."

The exemption from rot however, unfortunately refers only to the Æstivalis of the *Norton* family; those of the *Herbemont class* or *southern* Æstivalis are often affected by rot, and on this account their cultivation has been abandoned in the south-eastern States, Virginia, North Carolina, Georgia, and even in parts of Arkansas.

In southern and central Texas the Herbemont and its group of grapes seems free from rot, so far. Mr. G. Onderdonk writes: "Every year demonstrates more clearly that in southern Texas we must have Southern Æstivalis grapes, or have *none*, except varieties of Vinifera, in localities where the Phylloxera will not work, as in the sands of the immediate coast, or, as these European varieties may be preserved, by grafting on stocks of the *Rupestris*."

A very intelligent and reliable vine-grower writes us from Texas: "I have been investigating the grape question for two years in southern and central Texas. On the Rio Grande the Mexicans have been cultivating the European grapes for many years, but always where the land can be irrigated; but the area susceptible of irrigation is very limited. All the varieties of the *V. vinifera* and other grapes that ripen as late as September, are liable to fail in Texas on account of the summer rains, which come in August, causing the grapes to mildew and rot. But the cultivated varieties of ÆSTIVALIS ripen here in July, and do well when planted in the right soil. I have seen bunches of LENOIR, called here "Black Spanish," grown in sandhills of Bastrop county, that were as fine as any *Zinfandel*, which they much resembled, being long and compact, and very prolific. Yet nobody thinks it worth while to plant a vineyard. Grapes sold in Austin last summer at from 10 to 40 cts. per pound.

"Land suitable for grapes can be bought in Bastrop county, convenient to the Texas Central railroad, for from $2.50 to $10.00 per acre, with a market for all the grapes and wine within a few hours' travel by rail."

The varieties of this group generally prefer a dry, poor soil, intermingled with lime and decomposed stones, with a southern and south-eastern exposure; they seem to endure the severest drouths without flagging. Although we have seen some of them, especially the *Norton* and *Cynthiana*, bear immense crops on the deep, rich, sandy loam of our river bottom, their fruit does not reach the same perfection as on the hills. The *wood* of the true Æstivalis is very solid, hard, with small pith, and firm outer bark: so that it is almost impossible to propagate this species from cuttings. The bark on the one year old wood is of a dark gray color, bluish around the eyes. The *roots* are wiry and tough, with a smooth, hard liber, penetrating deep into the ground, successfully defying the attacks of Phylloxera. Their resistive power has been fully tested, and established beyond a doubt. As a stock for grafting they are far superior to Clinton—but we think they are too good and valuable to serve merely as a grafting stock.

Another form of the Vitis Æstivalis is the

VITIS LINCECUMII, or Post-oak grape.—Grows in Texas throughout the post-oak region of the tertiary. There are already two or three esteemed varieties of this class in cultivation. One of these, called McKee's Everbearing grape, because it is said to have ripe fruit during several months of summer, is considered an excellent table grape and good for wine. Mr. S. B. Buckley, State Geologist of Texas, writes: "At the place of the Wilkins, in the north part of Lamar county, I saw a Post-oak vine which, the family said, bore one of the best grapes, if not the very best, they had ever seen; and they had a large variety of grapes in cultivation. Mrs. Wilkins gave me some Post-oak grape wine which was excellent, the grape being considered the best for wine of any they had."

VITIS RIPARIA.—This most widely diffused and now most important American species of grapevines was but imperfectly known, up to within a few years, even to botanists; so that they could not clearly distinguish *V. Riparia* from *V. Cordifolia;* and in the works on practical grape-culture they were generally united under the one designation, "Cordifolia." The preceding treatise by Dr. Engelmann has now shown their absolute specific difference; but the circumstances whereby this knowledge was acquired are so interesting and instructive, that we, who have almost providentially led thereto, deem it our duty to record them.

In the winter of 1875 we received from M. Fabre de Saint Clement, in France, an order for several hundred thousand long cuttings, mostly of the "*Taylor*," which variety he had recognized as the best grafting stock among those with which he had experimented. In view of the impossibility to furnish more than 100,000 Taylor cuttings (as this variety is, on account of its deficient productiveness, but little cultivated), our G. E. Meissner proposed to M. Fabre (as also to MM. Blouquier & fils & Leenhardt, and others) to send him *wild Riparia* or *Cordifolia* cuttings, which bear the greatest resemblance to the *Taylor*, one of its cultivated varieties, and which, we had every reason to believe, would prove equally satisfactory, if not more so, as a Phylloxera-resisting grafting stock, for the reconstruction of their devastated vineyards. Fabre consented, and the success was beyond our most sanguine expectations. In October, 1877, Fabre first published the result in the "Journal d'Agriculture," and since that time this species was more and more recognized as the great remedy for the Phylloxera-destroyed vineyards of France. It was then called *Riparia Fabre* in France, but might more properly have been called *Riparia Meissner*.

Very large quantities were then ordered from us, and we had to look about for them far and near; nor was it an easy matter to avoid the admixture of Cordifolia, Cinerea, Æstivalis, and other wild grapes, which would not answer.

The careful, observing French vintners to whom these Riparias were so very valuable for their vigorous, rapid development in almost every soil, their great adaptability to rooting and grafting, and their almost perfect immunity from the Phylloxera, soon recognized that the so-called "Riparia or Cordifolia" embraced quite a group of somewhat deviating forms, of larger and smaller foliage, more or less hairy, more or less dark in color of wood, &c., some making stouter canes than others—differences resulting, very naturally, from the various soils and localities from which they were derived, and also from their frequently being mixed in the same locality;—they found, besides, that some cuttings (Cordifolia) would fail to root, though they arrived and were planted in the best condition. This, naturally, led to the study of their botanic character, now so fully established that we can at sight recognize and distinguish the true Riparia from Cordifolia; aye, in the mere cutting, in winter, as well as in the young plant and in the seed.

Besides these valuable characteristics, given by Dr. Engelmann, we have discovered some additional indications which will aid the non-botanist in distinguishing them. On the young shoots of *Cordifolia* the very small terminal leaves *open* as soon as formed (the same as in Æstivalis); those of the Riparia, on the contrary, remain folded for some days after they are formed and become larger, then expand, but only gradually. This is shown in our table of grape leaves (Figs. 40 to 43), which however do not show the more heart-shaped, roundish form of the *Cordifolia leaf* when fully grown, nor the form of the fully developed *Riparia leaf*, in which the sinus of the leaf-stalk is more widely open (truncated), often broad. Another very characteristic sign of Riparia is found in the shreddy character of the bark, which is underlaid by filaments resembling coarse yellow threads. We find a similar characteristic only in the *Rupestris;* but its filaments or threads are finer and not as strong as those of the Riparia. The bark of these two species will be found to peal off in shreds, whilst the bark of the *Cordifolia* and others will peal off in flakes.

We are just in receipt (July, 1883) of the first number of the "*Ampelographie Americaine.*" an Album of American Grapes, now being published in France—price 75 francs—by Em. Isard, which will contain from 80 to 90 Plates (phototypes) and descriptive text by Gustave Foex and Pierre Viala, all of the celebrated National School of Agriculture of Montpellier.* Of *Vitis Riparia* three forms will be figured and minutely described.

Dr. Despetis, who made the *Riparia* a special study, says that he knows 380 varieties or subvarieties of Riparia; some are tomentous (downy-leaved), others glabrous (smooth-leaved); some have light red wood, others dark, and some even white (gray) wood. But they all resist everywhere and succeed generally well; on limestone hills, however, they do not as well as the Jacquez (*Æstivalis*).

Many a grape-grower will ask: Of what practical importance is it to know the botanic characteristics of any species? The answer is, that it enables us to determine to which species a cultivated variety belongs, and to know thereby, beyond doubt, which qualities, common to all descendants of such species, it will have; what kind of soil or location is most suitable; whether it will easily grow from cuttings, be more or less subject to certain diseases, be more or less hardy, etc.

The *Vitis Riparia* comprise the most healthy and hardy grapes of the North Central States (N. C. S.), formerly designated as the North-west, extending to the Rocky Mountains of Wyoming, Colorado and New Mexico, and is found equally healthy and more productive at the south, in Arkansas and Texas. Hence we may also judge, from its geographical extension, as to its rare adaptability to various climates.

Alex. Hunger, an intelligent amateur grape-grower, native of Switzerland, now at Sauk City, Wis., writes us: "The woods and hills of Wisconsin are full of wild vines, and they grow also along the streams and creeks. The fruit of the Creek-grape(?) ripens late, tastes very harsh and sour; but the *Sand-grape*, (by which the *Riparia* is evidently meant) ripens with us in August already, is not disagreeable for eating, and makes a wine of fine aroma. It grows often in almost pure sand, and no cold can kill it. From the Sand-grape the North-west must get the proper varieties for its sandy plains and hills. If I were not too old I would cross the Sand-grape with those European grapes which grow in my native home (canton Graubunden), on the boundary line of wine-culture, where 'with one hand we may touch the glaciers and with the other pluck the noble grape.' The bunches of the *Sand-grape* are of the size of the Delaware; its foliage is simi-

* The "*Ecole nationale d'agriculture*" at Montpellier has not improperly been called the "*Phylloxera University.*" In its experimental garden, of about fifty acres, were planted nearly all the various grape-vines of the world, probably the most complete collection ever existing. And when we consider that its ground is thoroughly infested by the Phylloxera, thus affording the opportunity to test and study all the species and their varieties, with regard to their resistibility to the disease and in other respects, under most eminent investigators, we may well understand what a fund of information has been added during the last decade concerning the subject of this Catalogue.

Fig. 40. CORDIFOLIA.

Fig. 41. CORDIFOLIA.

Fig. 42. LABRUSCA.

Fig. 43. RIPARIA.

lar to the *Taylor*, darker green on its upper, lighter on its lower face, and more glossy; every third leaf is without a tendril. Crosses of this northern (Riparia) grape would seem desirable for our North-western States."

The CLINTON is the most prominent of its cultivated varieties, and the AUGHWICK, BURROUGHS, CHIPPEWA, FRANKLIN, HUNTINGDON, MARION and OPORTO belong to the same group or family. The BACCHUS is a seedling of *Clinton*, and probably also *Schraidt's seedling* BLACK PEARL, *Ricketts'* PEABODY, &c. The TAYLOR was held to belong to a somewhat different form of the *Riparia*, found growing along the Alleghany range, from southern New York to Alabama; it certainly has a close resemblance to this form of the Riparia, but botanists have lately discovered and established that the Taylor is an accidental cross with Labrusca, which is confirmed by the character of many of its seedlings. This variety, much esteemed for its vigorous growth, health and hardiness, as also for its superior quality for wine, was, however, generally unproductive on account of its more or less deformed stamens, with short or rather curved filaments; a defect exhibited also in most of the wild Riparias, which are the most profuse bloomers of any grape-vines. FULLER, in his old book on grape culture, first expressed the opinion that some individuals of this group (Taylor, Othello, &c.) possess excellent qualities, which, when properly developed, and their defects remedied, will make the best wine grapes in the country.

Following this suggestion of Mr. Fuller, already quoted in the former editions of this Catalogue, a large number of experiments have been made with raising seedlings from Taylor and Clinton, and these are now crowned with eminent success, having produced some of the most valuable and promising new *wine grapes*, especially adapted to the wide range of the Riparia Class. See *Amber*, *Bacchus*, *Elvira*, *Grime's Golden*, *Missouri Riesling*, *Montefiore*, *Noah*, *Pearl*, *Transparent*, *Uhland*, &c.

The foliage is rarely attacked by mildew, but the leaves, possibly owing to their smoothness, are occasionally injured by insect punctures. The Phylloxera prefers the foliage of this class of vines to that of all others—so that, in some seasons, it is covered with leaf-galls made by this formidable insect. The fruit is less subject to rot, and is noted for keeping well after being gathered from the plant. That of the northern form is late in maturing, and seems to reach its greatest perfection by remaining on the vine until the thermometer indicates proximity to the freezing-point, when, even in northern localities, it proves to be a fruit of fair quality either for table or wine. The greatest objection to it as a wine grape is that of having too much acid. The fruit is not so deficient in sugar as is generally supposed, having enough of this important ingredient for a good wine. Nor has it any foxy or musky taste whatever, the judgment of our friends in France to the contrary notwithstanding. The peculiar flavor in some varieties may displease them—tastes differ; we, ourselves, do not admire the Clinton goût, but it has certainly no resemblance to what we call "foxiness," as the characteristic of Labrusca. The flavor of *Taylor* and its seedlings seems to us unexceptionable. The *Marion* and other varieties of this class may also be preferable to Clinton in this respect. Analysis shows that they have a sufficiency of sugar, and it seems probable that the wines only require age to develop their qualities.

It is known that wines of the Clinton variety, when kept in a suitable cellar from four to six years, assume a fine character.

The mode of management and culture has also a decided influence upon the productiveness of this species. The shoots on young plants in good soil grow with much vigor during early summer, frequently forming canes from 14 to 20 feet in length before the end of the season. On these canes the best developed buds are some distance from the base, or point of growth on the stem; consequently, if cut back closely at the fall or winter pruning, the best buds for fruit-bearing are removed, and a luxuriant growth of wood, with a minimum crop of fruit, will be the result. The varieties of this group should be planted on rather *poor soil*, deeply and well cultivated, as they are naturally rampant growers, and, when planted in rich soils, are almost uncontrolable.

The Riparia is more accommodating to various soils than any other grape-vine; it grows well almost everywhere, except on heavy yellow clay soil, and on limestone hills it does not as well, of course, as the Æstivalis: it is in name and in fact a river-bank grape.

The wood of the cultivated varieties is soft, containing a thick medulla; cuttings will, therefore, grow very readily. The *roots* are wiry and tough, with a thin, hard liber, growing rapidly. They also possess full powers of resistance to the Phylloxera, which is usually found in small numbers on their roots even while their foliage is densely covered with its galls. The roots have so much vitality that new rootlets push out from the swellings more rapidly than the insect can destroy them.

V. RUPESTRIS has, of late, already become of very great value as stock for grafting. In southern Texas some experiments are being made with Vinifera grafted on Rupestris, and we predict for the same a complete success. Wheresoever the Lenoir (Jacques or Black Spanish) and Herbemont will flourish without covering in winter and without mildew and rot in summer, the finest European varieties will, we think, succeed, if protected from the root-louse (Phylloxera) by grafting on Rupestris or other resisting native stock, best adapted to the soil and climate. In France, also, the Rupestris is now used to some extent as a Phylloxera-proof grafting stock, and is found especially valuable on poor, rocky soil, and hot, dry, exposures, where other sorts are less adapted. Some promising hybrids between Rupestris and Vinifera have lately been produced in France.

VITIS VULPINA, *Linnæus*.—Southern grape-growers generally designate this species as Vitis *Rotundifolia* (Michaux).

This name seems to us more appropriate. *V. Rotundifolia* signifies "round-leaved," as this species has leaves which are nearly round, unlike those of any other species. *V. Vulpina* signifies "Fox-grape;" but it has less resemblance than any other species with the *Labrusca*, which is generally known as *the Fox-grape*, and, while the name "*vulpina*," as the translation of or synonym with "fox," has sometimes been applied to the "*La-*

brusca" and even to other species, no other species has ever been designated by the name "*Rotundifolia.*" This latter designation would avoid confusion in the grape nomenclature and is therefore preferable. Many botanists, including Bertram, Le Conte, Rafinesque, Ravanel, and Buckley, followed *Michaux* in calling it "Rotundifolia," and we may be excused for not following Linnæus in this instance, and feel justified in thus designating this southern species as it is known among southern people, southern grape cultivators, and their writers. The *V. Rotundifolia* is strictly confined to the southern States, and in foliage and wood is very unlike any other grape, either native or foreign, distinguishing itself by its small, roundish, shining leaves, never lobed, and green on both sides; by its bright, smooth bark, never scaly or shaggy; by its fruit, which forms no bunches, but grows in large, thick-skinned and pulpy berries. only about 2–4-6 in number on a stem; by its tendrils, which are never forked like those of other grape-vines. The varieties of this type cannot be grown from cuttings. Pruning does not benefit them; on the contrary, they must be left to grow free, without any trimming, except cutting off smoothly the shoots and suckers from the ground to the lath-work or scaffold which may have been erected to support them. Without care or labor, save some good cultivation of the soil, they produce annually large and sure crops, being entirely free from rot and mildew, and, it seems, also from the attacks of insects. The Vitis Rotundifolia, so far, enjoys perfect immunity from Phylloxera, (some galls have been found on their *leaves*, but no trace of the insect on their roots. which are of an astringent, acrid taste). This immunity caused them to be exported into France, but their fruit is so deficient in grape sugar (although it tastes sweet, containing scarcely *any* acid) and it is so rich in musky flavor, that it cannot satisfy the refined French taste; and, as a grafting stock, the hardness of the wood and different construction of the bark make the Rotundifolia unfit for this purpose.

P. J. Berkmans, of Augusta, Georgia, who makes the propagation of this species a specialty, enumerates seven varieties: SCUPPERNONG, FLOWERS, THOMAS, MISH. TENDER PULP, PEDEE, and RICHMOND (there exists also an Isabella-seedling under the name of Richmond).

HYBRIDS.

Besides the varieties referred to either the one or the other of these species, we now cultivate many grapes which originated by *cross-breeding*, either through the agency of wind or insects, or through the efforts and skill of man.

The former or natural hybridization is no doubt of very frequent occurrence, but, as neither the act can well be observed, traced or recognized, nor the character of these young seedlings thus produced be ascertained, they are generally passed unnoticed in the vineyard, or are destroyed. Judging from the great tendency to variation in seedlings of cultivated varieties, we are inclined to believe that most varieties, generally called *pure* seedlings, yet so very dissimilar to their parents, are produced by natural hybridization. But the question arises, how are grapes thus cross-fertilized by nature without the aid of man? "By insects" seems scarcely a sufficient explanation; and we venture the following new hypothesis, viz., that the stigma of the grape does not receive the pollen of its own individual blossom, as probably the two are not ready for fecundation at the same moment. Thus a mere kindly breeze may be sufficient to bring about cross-fertilization where different varieties, blooming at the same time, are growing in proximity to each other.

Without discussing the subject any further, we state that we believe to recognize in

the ALVEY, a Hybrid between			*Æstiv.* and	*Vinifera:*
the CREVELING,	"	"	*Labr.* "	*Riparia;*
the DELAWARE,	"	"	*Labr.* " *Vinif.*	*Vinifera*, or *Riparia;*
the ELVIRA,	"	"	*Ripar.* "	*Labrusca,*

and so in a few others (as will be mentioned in their description) possessing certain distinct characteristics of *two distinct species;* and, while we do not claim to be botanists, we are glad to find our observations endorsed by the botanists of both this country and of Europe.

From later observations (since the issue of our Catalogue, second edition) we are led to consider also the LOUISIANA or RULANDER as hybrids between *Æstivalis* and *Vinifera;* and the HUMBOLDT, which the late Fr. Muench supposed a pure seedling of the LOUISIANA, as the result of an accidental cross between this and some other variety.

It has already been mentioned (page 20) that the TAYLOR is now considered a cross produced by natural hybridization between a *Labrusca* and a *Riparia.* Characteristics of *both* species are quite distinct in the Taylor-Seedlings of Rommel: the AMBER, ELVIRA, ETTA, FAITH, MONTEFIORE, PEARL; as also in Wasserzieher's Taylor-Seedling NOAH, &c. Accidental crosses between different varieties of the same species must be more frequent, though admitted but in few varieties, such as BEAUTY (Catawba crossed with Maxatawny), and NIAGARA (Concord crossed with Cassady), and generally claimed to be "pure seedlings."

The second class, hybrids produced by artificial cross-fertilization, though of but recent date, are now very numerous, and very interesting and important results have been attained through this agency. When the supposition that the seedlings from foreign species, raised in our own soil and climate, would be more hardy, proved fallacious, efforts were made to secure hybrids between the native grapes and Vitis Vinifera, as it was hoped thus to combine the superior excellence of the foreign with the health and vigor of our native plants, and in the opinion of some eminent horticulturists this desirable result has already been very nearly or quite accomplished.

But for practical grape-culture on a large scale, all hybrids produced by crossing the foreign on our native grapes have generally given unsatisfactory results in this country. It is a remarkable fact that some of these hybrids are very successful in Europe, as the TRIUMPH, a cross between Concord and Chasselas mosquée by Campbell; the OTHELLO, a cross between V. Riparia and Black Hamburg by Arnold: BLACK EAGLE and BLACK DEFIANCE, crosses between Concord and Black St. Peters by Underhill.* These and some other hy-

* CROTON, a cross between *Delaware* and *Chasselas*; suffers from Phylloxera almost as badly as its parent, the Chasselas de Fontainbleau.

brids have evidently inherited from the American parent the Phylloxera-resisting root, but also from the European parent the non-resistance to our climatic influences and the great sensibility to mildew and rot. In localities of this country where these destructive influences and diseases do not prevail, most of these hybrids will prove highly satisfactory; they are—

A. Hybrids between *Labrusca* and *Vinifera:*

ADELAIDE,
AGAWAM,
ALLEN'S HYBRID,
AMINIA (R. 39),
BARRY,
BLACK DEFIANCE,
BLACK EAGLE,
BURNET,
CLOVER STR. BLACK,
CLOVER STR. RED,
CONCORD CHASSELAS,
CONCORD MUSCAT,
DIANA HAMBURG,
DON JUAN,
DOWNING,
EARLY DAWN,
ESSEX,
EXCELSIOR,
GÆRTNER,
GOETHE,
HERBERT,
HIGHLAND,
IMPERIAL,
IRWING,
LINDLEY.
MASSASOIT,
MERRIMAC,
PLANET,
REQUA,
ROGERS' HYBRIDS,*
SALEM,
SENASQUA,
TRIUMPH,
WILDER,

and many more, less known.

B. Hybrids between *Riparia* and *Vinifera:*

ADVANCE,
ARIADNE,
AUGUST GIANT,
AUTUCHON,
BRANDT,
CANADA,
CORNUCOPIA,
NAOMI,
NEWARK,
OTHELLO,
PIZARRO,
QUASSAIC,
SECRETARY,
WAVERLEY.

C. HYBRIDS between *Varieties of American species* and *Hybrids*, especially *Delaware.*

ALMA (Bacchus with Hybr.)
BERCKMANS (Clinton with Del.)
BRIGHTON (Concord with Diana Hamb.)
CENTENNIAL (Eumelan with Del.)
DUCHESS (w. Concord with Del.)
EL DORADO (Conc. with Allen's Hybr.)
GOLDEN GEM (Iona with Del.)
LADY WASHINGTON (Conc. with Allen's Hybr.)
MONROE (Concord with Del.)
POUGHKEEPSIE (Iona with Del. or Walter).
PURITY (? on Del.)
RARITAN (Concord with Del.)
ROCHESTER (Diana with Del.)
WALTER (Del. with Diana),

and others; mostly new.

These are considered very promising, and some, as the BRIGHTON, the DUCHESS, the LADY WASHINGTON, are already highly esteemed; it is supposed that they will become more successful, their origin being three-fourths native. But for localities where the Delaware, or other hybrid parent, does not succeed, mainly on account of mildew, we cannot share the high expectations for any of them expressed by others. The efforts of hybridizers therefore have been, of late, wisely directed to the producing of crosses between purely native varieties; most remarkable among the new grapes thus produced are the JEFFERSON (white *Concord* with *Iona*) and the EMPIRE STATE (a seedling of the *Hartford Prolific* fertilized with the Clinton), both by Ricketts. And it seems that in these, fine quality and beauty of fruit are united with a strong vigorous growth of vine and thick, mildew-resisting foliage.

In the former editions of this Catalogue we already expressed our conviction that the production of healthy, successful Hybrid grapes from tender, unreliable natives, such as the Iona, with the here still more unhealthy Vinifera, is highly improbable, especially when some glasshouse-grown variety of the latter is used for that purpose. European horticulturists are now largely engaged there in producing new hybrids between American and their own varieties; but it is doubtful whether even these will prove a great gain for American grape culture *here*. Its progress depends, we think, on the production of grapes from the seed of our native species, and from cross-breeding their best varieties, carefully selecting those most adapted to our own locality.

* Not named.

LOCATION.

The only general rules we can give to guide in the selection of a proper, desirable location for vineyards, are:

1. **A good wine-growing region is one where the season of growth is of sufficient length to ripen to perfection our best wine grapes, exempt from late spring frosts, heavy summer dews, and early frosts in autumn. Do not attempt, therefore, to cultivate the grape in low, damp valleys, along creeks; high table-lands and hillsides, with their dry atmosphere and cool breezes, are preferable to rich bottom lands; low situations, where water can collect and stagnate about the roots, will not answer; wherever we find the ague an habitual guest with the inhabitants, we need not look for healthy** grape-vines; but on the hillsides, gentle slopes, along large rivers and lakes, on the bluffs overhanging the banks of our large streams, where the fogs arising from the water give sufficient humidity to the atmosphere, even in the hottest summer days, to refresh the leaf during the night and morning hours, there is the location for the culture of the grape. *Shelter* has also an important bearing on the healthy growth of the vines; some well-located vineyards have not proven lucrative for the want of proper shelter; where it is not afforded by woods growing near by, it shoud be provided for by planting trees; large trees, however, should not be planted so near the vines as to interfere with their roots. One of our vineyards has been thus protected by an arbor vitæ fence from the north and west winds. This fence is now 15 years old, over 8 feet high, and is considered one of the finest ornaments to our grounds. There are some locations so

favored that no artificial protection is needed. Remember, however, that no one locality is suited to all kinds of grapes. (See page 6).

2. A good soil for the vineyard should be a dry, calcareous loam, sufficiently deep (say 3 feet), loose and friable, draining itself readily. A sandy, yet moderately rich soil is better adapted to most varieties than heavy clay. New soils, both granitic and limestone, made up by nature of decomposed stone and leaf-mould, are to be preferred to those that have long been in cultivation, unless these have been put in clover and rested a few years. If you have such a location and soil, seek no further, ask no chemist to analyze its ingredients, but go at once to

PREPARING THE SOIL.

"The preparation of the soil is undoubtedly one of the most important operations in the establishment of a vineyard, and one of its objects should be to get the soil of a uniform texture and richness throughout, but not over-rich. This deep stirring of the soil puts it very much in the condition of a sponge, which enables it to draw moisture from the soil beneath and from the atmosphere above, and hold it for the wants of the plant; hence, soils that are drained and deeply stirred, keeping the good soil on the surface, are less subject to the evils that accompany and follow a drought than those that are not so treated. It is of the first importance, therefore, that vineyards and orchards at least should be put in the best condition for the reception of the vines and trees, if the best results are aimed at." *Pet. Henderson.*

The old system of *trenching* is no more practiced, except upon very hard, stony soil, and upon steep hillsides, being too costly and of very little, if of any, advantage. The plow has taken the place of the spade, and has greatly lessened the expense. While we would urge a thorough work in the preparation of the soil before planting the vine, and warn against planting in ditches, or, still worse, in square holes, we believe that by careful grubbing (in timber lands), leaving no stumps, which would only be continual eyesores and hindrances to proper cultivation, and then, using a large breaking plow, followed by the subsoil plow, the soil will be stirred as deeply (say 20 inches) as is really necessary to insure a good and healthy growth of vines. This will require two to three yoke of oxen to each plow, according to the condition of the soil. For old ground a common two-horse plow, with a span of strong horses or cattle, followed in the same furrow by a subsoil stirrer, will be sufficient to stir the soil deeply and thoroughly, and will leave it as mellow and as nearly in its natural position as desirable. This may be done during any time of the year when the ground is open and not too wet. Most soils would be benefited by under-draining; the manner of doing this is the same as for other farm crops, except that for vines the drains should be placed deeper; it is less important on our hillsides, and too costly to be here practiced to a great extent; wet spots, however, must be drained at least by gutters, and, to prevent the ground from washing, small ditches should be made, leading into a main ditch. Steep hillsides, if used at all, should be terraced.

PLANTING.

The soil being thus thoroughly prepared and in good friable condition, you are ready for planting. The proper season for doing this here, is in the fall, after the 1st of November, or in the spring, before the 1st of May. Seasons differ and sometimes make later planting advisable, but never during frost nor while the ground is too wet. If you have been delayed with your work of preparing the soil in spring, the young plants from the nursery should be hilled in some cool, dry place and covered, so that their vegetation be retarded; if they have already made shoots, be specially careful to guard against their roots getting dry. Most vineyards are planted in spring; in northern and very cold localities, this may be preferable. *We* prefer fall planting; the ground will generally be in better condition, as we have better weather in the fall, and more time to spare. The ground can settle among the roots in winter; the roots will have healed and calloused over, new rootlets will issue early in spring before the condition of the ground would have permitted planting, and the young plants, commencing to grow as soon as the frost is out of the ground, will start with full vigor in spring. To prevent the roots from being thrown to the surface by alternate freezing and thawing, a mound of earth hoed up around the plants, or a ridge thrown up with a plow so as to elevate the ground somewhat in the rows, will be found to afford all the protection necessary. By no means delay planting till *late* in spring, and, if your ground is not ready in time, you had much better cultivate it with corn or hoed crops of some kind, and postpone planting until next fall. Planting in rows, six feet apart, is now the usual method; it gives sufficient space for a horse and man to pass through with plow or cultivator; the distance

in the rows varies somewhat with the growth of the different varieties and the richness of the soil. Most of our strong vigorous, growers, the Concord, Ives, Hartford, Clinton, Taylor, Norton, Herbemont, will need 8 to 10 ft. in the rows; Scuppernongs are planted 20 to 30 feet apart; while the Delaware, Catawba, Creveling, Iona, may have sufficient room when planted 6 feet apart. The dwarfing treatment practiced with European varieties, especially by German vintners, will not do for American vines, which must have ample room to spread and a free circulation of air. The number of vines required to set an acre (containing 43,560 square feet) will be—

Distance, feet.	*Metres.*	*Number.*
6 ft. by 6 ft.	1 m 85 by 1 m 85	1,210
6 ft. by 7 ft.	1 m 85 by 2 m 15	1,037
6 ft. by 8 ft.	1 m 85 by 2 m 46	907
6 ft. by 9 ft.	1 m 85 by 2 m 75	807
6 ft. by 10 ft.	1 m 85 by 3 m	725
7 ft. by 7 ft.	2 m 18 by 2 m 15	889
7 ft. by 8 ft.	2 m 15 by 2 m 46	777
7 ft. by 9 ft.	2 m 15 by 2 m 75	690
7 ft. by 10 ft.	2 m 15 by 3 m	622
8 ft. by 8 ft.	2 m 46 by 2 m 46	680
8 ft. by 9 ft.	2 m 46 by 2 m 75	605
8 ft. by 10 ft.	2 m 46 by 3 m	545
9 ft. by 9 ft.	2 m 75 by 2 m 75	537
9 ft. by 10 ft.	2 m 75 by 3 m	484
10 ft. by 10 ft.	3 m by 3 m	435

One acre = 41 *ares* French measure, or one *hectare* nearly equal to two and a half acres.

Having determined the distance at which you desire to plant the vines, mark off the rows, running them parallel, and with the most level lines of your slope or hillside, so that you may easily plow between the rows and that the ground may not wash. (On an eastern slope the rows will therefore run in a direction from north to south, which most vine-dressers prefer.) Be careful, on sloping ground, to leave spaces for surface drains; the steeper the hillsides the more frequent must these surface drains be. Then divide the rows into the desired distances by the aid of a stretched line, and put small stakes where each plant is to stand. Now, if the ground is sufficiently dry so as to pulverize easily, make the holes to receive the vines as shown in Fig. 44. The depth of these holes must necessarily vary somewhat with the nature of the soil. On very steep hillsides, and especially on southern slopes, with naturally warm, dry soil, you must plant deeper than on gentle slopes with deep, rich soil, or on bottom land and rich prairies. Eight inches will be deep enough on the latter; on the former we should plant from twelve to fourteen inches deep.

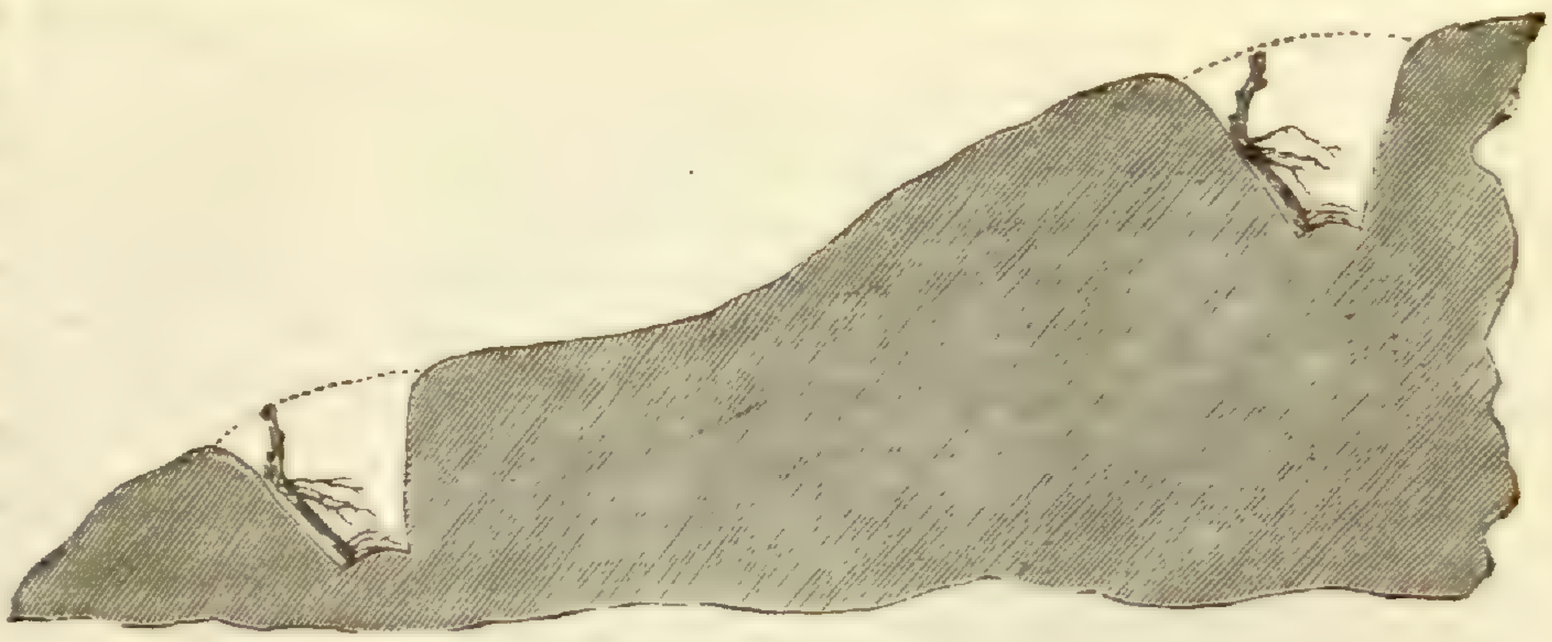


Fig. 44.

Having made the holes—and it is best not to make too many at a time, as the ground will dry out too quickly—you can go to planting. In planting it is important to give the roots their former position, and to have them each and all firmly surrounded with good fine soil, pressing it down with the hands or foot; then fill up the hole with earth, forming a very small hill over the head of the plant, so that no part of it may dry up, yet so as to permit the young tender shoot to penetrate easily.

Every beginner in *Grape* culture knows that young rooted vines are used for planting, whether it be for whole vineyards or merely for the garden or arbor, and that such young vines are usually raised in the nursery from cuttings or layers. But the reason why they are *not* grown from seeds is not generally so well known, and even among old experienced grape-growers some erroneous ideas prevail with regard to seed culture and questions connected with this, now more than ever important and interesting subject. It is scarcely necessary to mention that the wild grape grows and propagates itself from seed only. This wild grape constantly reproduces itself; i.e., its seedlings do not materially differ from their parent vines. Transplanted into richer soil, and receiving care and cultivation, its berries may increase in size, and in the course of years may somewhat improve and change its character; if, then, we take the seed of this cultivated vine, especially if it was grown in proximity to other different grapes, the seedlings of these will more materially differ. So great is this tendency to variation, that of a hundred seedlings of one cultivated vine scarcely two will be found exactly alike; some will differ widely; nearly one-half will be male plants and will not produce any fruit at all, while most of the others will retrograde to their wild origin, and

scarcely one, perhaps, be an improvement on the cultivated parent.

The layer or the cutting of a grape-vine will, on the contrary, exactly reproduce the parent vine from which it was taken, and even any transplanting of the same, into a widely different locality, cannot change it. The differences in soil and climate may *improve* or *impair* the vigor of the vine and its foliage, the size and quality of its fruit; in other words, they may be more or less favorable to the development of its inherent qualities, to the good or ill success of the variety; but they will never materially change it in appearance, form, taste, color—much less in its botanical characteristics.* The practical grape-grower, therefore, who desires to plant certain varieties, all fruit-bearing, will not plant seeds, nor young plants raised from seeds—although some theorists pretend that the long continued propagation and culture of the grape from the wood was the cause of its recent failures to withstand diseases, insects, and other parasites. Careful and unprejudiced investigation and reasoning as well as practical experiments have fully established the facts: that seedlings resist no more successfully than plants from cuttings, nor are they much less sensitive to the vicissitudes of climate; and that the long continued culture and propagation from wood has nothing to do with the greater or less resistance to diseases, nor has their cellular tissue been softened thereby.

For practical grape culture we should use none but the best rooted plants of those kinds which we wish to produce. Some vintners, from supposed economy, use only cuttings to plant their vineyards, placing two cuttings where one vine is to grow; but the result generally is unsatisfactory, especially with American varieties, most of which do not root as easily as those of the European Vinifera class, and make much replanting necessary; and where both cuttings do grow, one must be pulled out. Those vintners would do better, by far, by first growing their cuttings one or two years in nursery rows, and afterwards transplanting the best of them to their intended vineyard.

But if we desire to obtain NEW varieties we must plant seed. This is a far more uncertain, slow and difficult operation than most people imagine, and but very few have been successful in it. Just as some careful breeders of animals have succeeded in raising improved kinds, on which they engrafted certain qualities by crossing, so have horticulturists endeavored to reach the same end by hybridizing the best varieties of grapes and planting their seeds, having due regard to the characteristics of the parents from which they breed. (See "Hybrids," p. 28.)

But of late still another very important function has been assigned to seed planting, namely, to produce in Europe (especially where the import of our cuttings and rooted plants has been prohibited) American vines, which resist the Phylloxera, as grafting stocks. For, however great the tendency to variation is in seedlings, still, under all circumstances and changes of soil and climate, they retain the Phylloxera-resisting root as well as other botanical characteristics of their parents.* During the last few years we have furnished several thousands of pounds of grape-seed to Austria, Italy, Spain, and Portugal. The reports of their germination were generally favorable, while seeds sent by others mostly failed. The following report of v. Babo, kindly furnished us this spring (1883) is certainly both reliable and interesting in this respect: "Of the grape-seeds received from you last year, the *Riparia* sprouted best; so well, indeed, that we can scarcely manage the innumerable small seedlings. All the other seedlings (from cultivated sorts) show great variety in fruit, color, foliage, &c. Most variable are those from *Taylor* seed; from the 2,500 bearing vines raised from seed of this one variety, a hundred distinct sorts can easily be selected. The young plants from Riparia seed seem not to vary much, as we can find but very little essential difference in their foliage."

We do not intend here to discuss the various modes of multiplication or propagation of grape-vines from cuttings, layers or single eyes (buds), still less the methods of producing new varieties from seed and of hybridizing, as this would far exceed the scope of this brief manual, nor do we desire to say whether plants grown from cuttings, from single eyes or from layers, are preferable. Propagators and nurserymen are not considered disinterested, impartial judges on this question. But we may reasonably suppose that those who read this catalogue are either our customers or desire to purchase rooted vines from us, and want to get *the best plants*. Vines raised from layers were in former years held to be superior, and are still pre-

* The erroneous opinion that a grape transplanted to other countries may become entirely changed by influences of climate and soil was often supported by errors or deceptions in transplanting a vine or cutting, not true to name. Thus the famous Tokay grape was supposed to have been transplanted to the Rhine 150 years ago, and, as it was there found to be a miserable grape, quite different from the noble Tokay, this was ascribed to the influence of the different soil. But lately it has been discovered that the grape transplanted from Tokay (in Hungary), and known in Germany under the nickname "*Putzscheere*" (Snuffers), is the same grape which also grows at Tokay, and is known there under the name "*Gyönyszelo*" (white pearl), and that it is there also of poor quality, and is *not* the excellent variety "*Frumint*" of which the celebrated Tokay wine is made.

*For this purpose it is best to use the seed of the wild grape, especially of *Estivalis* and of *Riparia*; the seed of *hybrids* should not be used.

ferred by many, but unprejudiced and observing cultivators have found that they only *look* stronger and finer, but are *not as good* as plants properly grown from cuttings or single-eyes, of mature, healthy wood. The disposition to rapidly multiply the new varieties of grapes has led to the production of vast numbers of vines from summer layers, or, still worse, from green cuttings. The plants so produced usually prove a disappointment to the planter, and injure the reputation of new varieties.

Our German and French vine-dressers generally practiced growing vines from *long* cuttings, but short (two or three eye) cuttings will usually make stronger and better ripened roots. Others again have obtained the best results from single-eye plants, and consequently prefer them. The celebrated French ampelograph Dr. Jules Guyot praised single-eye cuttings as physically and physiologically most approaching to those raised from seed. We have tried all, and find that it makes very little difference how the vine has been produced and raised, provided it has strong, firm, healthy, well-ripened roots, and wood, with plump and perfect buds. (We never found any grown from green or unhealthy wood that had them.) As a general rule, a *well grown vine* is in its best condition for planting when *one* year old. Fuller and some other good authorities prefer two-year old transplanted vines; vines older than two years should not be planted, and so-called extra large layers "for immediate bearing" are a humbug.

There is, however, one method of propagating the grape, namely, by GRAFTS, which belongs more properly to the sphere of the cultivator, the vineyardist, than the nurseryman or propagator, and which presents itself under aspects almost entirely new.

GRAFTING.

Grafting the grape-vine is now practiced on a gigantic scale in Europe, where the continued inroads of the Phylloxera have carried devastation and destruction over an immense area of vineyards, once thrifty and blooming. Many methods have been tried; untold sums of money have been expended in vain attempts to check the march of this terrible enemy of the European grape; but, alas! these attempts have practically proved to be failures. By the application and continued use of chemical insecticides some vineyards have been kept up in a state of comparative health and productiveness; but, unfortunately, the cost of these annual applications is too high for general use, and can only be afforded by the proprietors of the most renowned vineyards, the "grand crus," whose products command such extraordinary prices as to cover the extraordinary expenses of preserving them by this means. Vineyards which can be entirely submerged in water every winter, for a period of at least fifty days, can also be maintained in spite of the Phylloxera. And, finally, vines planted in soil containing at least 60 per cent. of pure sand (silica) offer also a comparative resistance to the insect.

These three means of maintaining the European grape in spite of the Phylloxera apply themselves only in such exceptional cases, however, that European grape culture would be doomed to an almost entire destruction were it not for the American vine coming to the aid of its European sister. The American vine, with its strong, robust system, and its tough, vigorous root, resists the Phylloxera, and by lending its root to the European vine makes the reconstruction of the devastated vineyards possible.

When the last edition of our catalogue was published (1875) this matter was stil a problem, and many then doubted whether the solution, positively and practically, would be a satisfactory one. To-day this problem is solved, and it is placed beyond all doubt that the use of the American resistant vine as a *grafting stock* for the European grape (V. Vinifera) is the true solution of the Phylloxera question for the European vintner—that solution which alone has so far been found generally applicable, generally practical, and generally satisfactory.

Millions upon millions of vines are now grafted in Europe every spring, some on simple cuttings, some on nursery plants, and others in vineyard plantations; but in all cases the grafting stock is of American descent. The stocks most generally employed for this purpose are types of our wild *Vitis Riparia*, which probably constitutes four-fifths of the grafting stocks now employed, having been found to adapt themselves to nearly all kinds of soils and exposures, and uniting the greatest powers of resistance to the insect with a remarkable facility of rooting from cuttings and of receiving the graft of the V. Vinifera.

We will be pardoned for mentioning here with a certain degree of pride and satisfaction, that we were the *first* to recommend and to bring this valuable grafting stock to the notice of the French grape-growers (in Dec., 1875) and to place it in their hands in sufficient quantities to test its merits, which merits they soon learned to appreciate. Since then the French vintners have propagated and increased the stock in a wonderful degree, and last winter

the single Department of Herault alone furnished not less than twenty millions of plants and cuttings of *Riparia*, all to be grafted with the European grape.

The results obtained by grafting the *V. Vinifera* on American roots have generally been found so satisfactory, not only as the means of resisting the Phylloxera, but also as imparting greater vigor and productiveness to the European grape, that the practice of grafting on American stocks would probably be continued even if the dreaded Phylloxera were to suddenly and entirely disappear. Unfortunately, the very reverse, the increase and spread of the insect, is far more probable; and the sooner those grape-growers of southern Europe whose territory is not yet infested by this scourge reconcile themselves to the idea of reconstructing their precious but doomed vineyards by the means of grafting on American Phylloxera-resisting stocks, the better it will be for them.

We hope our American readers will excuse these rather lengthy remarks about "grafting in Europe"; but some of them, especially our friends in California, where the European grape forms the main basis of grape culture, may find them of some practical interest.

The question of grafting the grape-vine has many other points of interest for us, aside from the object of placing a variety which is subject to the Phylloxera beyond the pernicious influence of this insect. Thus another object for which grafting is very desirable is the early testing of new varieties. By grafting on a vigorously bearing vine we will generally obtain bearing wood, and sometimes even fruit, at the first season. We are also enabled, by grafting, to turn old vigorous vines of perhaps some worthless variety to good account, as with a little trouble and care and the loss of only one year we can change them into some choice and valuable variety. Before we enter into the details of the *modus operandi* of grafting, we will first speak of the conditions generally considered essential to the successful performance of the operation.

First. THE STOCK. Judging from our own experience, we cannot side with those who claim that in all cases the stock and scion should belong to the same class in order to insure perfect success.

A point which is of far more importance is the perfect health and vigor of the stock. We should never select a sickly or diseased vine, nor one subject to the attacks of the Phylloxera, as a stock to graft upon. Even if the graft should live it will thrive but poorly, unless indeed it belongs to some very vigorous variety and is grafted deeply enough below the surface, to form its own roots; these will then support it entirely, and it will soon dissolve its union with the unhealthy stock. But even in this case it will require years to overcome the effects of the uncongenial partnership. If the object in grafting is to guard a variety subject to the Phylloxera against the ravages of this insect, we should select for the stock a vine of a strong and vigorous variety, which possesses recognized powers of resistance to the insect. The graft should then be inserted as near the surface of the ground as possible, and, where practicable, even above it. Some have asserted that the stock and scion should be of varieties as near alike in vigor of growth as possible, but with this we cannot agree. We should invariably prefer to graft a weak grower on a strong one.

Second. THE SCION. This should come from a healthy and short-jointed cane of last summer's growth, and of moderate size (a little stouter than an ordinary lead pencil is the thickness that we prefer). It should be cut from the vine before very hard-freezing weather, and kept in a cool cellar, either in damp moss, sand, or sawdust, or buried in the ground. In case the grafting is to be performed *late* in spring, the scion may be kept dormant in an ice-house.

Third. WHEN TO GRAFT. The best time, as far as days and months are concerned, varies, of course, with the locality and latitude; but, as a rule, we would state that the vine cannot be grafted with good success, either while the sap is running so freely as to cause the vine when cut to bleed heavily, as it is termed, nor yet (except by the process of inarching, of which hereafter) from the time in the spring, or rather in the early summer, when the young shoots begin to turn hard and fibrous; this period generally commences about the time of the bloom, and lasts until after the fall of the leaf. This reduces the time for successful grafting to two periods, the first one lying between the fall of the leaf and the rising of active circulation in the spring, and the second one commencing after this exceedingly strong flow of sap has abated and lasting until the full development of the first young growth.

In the more southern States grafting may be successfully and practically performed during the first period. In fact, the late Dr. A. P. Wylie, of Chester, S. C., considered the fall or early winter, in that latitude, as the *proper* time for grafting. Farther north, and even in the latitude of St. Louis, fall grafting is not quite as certain, for even when protected by a mulch of straw or leaves the graft is in danger of being thrown out by the heaving of the ground

caused by the frost. In this latitude, however, we often have fine days in February and early in March, when the ground is open and before the active flow of sap has commenced, which should be improved for the operation. Still farther north, where the ground opens late and spring comes in abruptly, these days are generally so few that they can seldom be made of any use. For these latitudes the best opportunity lies in the second period, or during the time in which the sap has ceased its active flow and exudes from the wound in a gummy state. Some even claim good success in mid-summer with scions of the same season's growth.

In describing the operation proper, of grafting in the several different methods, we do not think that we could give better directions than by following largely an excellent new French work, "*Traité théorique et pratique du Greffage de la Vigne*," by AIMÉ CHAMPIN, an eminent and most intelligent practical vineyardist, and a most spirited and elegant writer, who has treated the subject in an exhaustive work. His book has also been translated into the German language by Dr. ROESLER. ("Der Weinbau, seine Cultur und Veredlung, von Aimé Champin. A. Hartleben & Co.: Wien, 1882.") To Mr. Champin we are also indebted for the cuts relating to grafting, which are part of the seventy excellent illustrations embellishing Mr. Champin's work. These cuts were drawn from Nature, with rare accuracy and skill, by Miss Aimée Champin. To all who are interested in the question of grape grafting, we can recommend this work as one of the very best on the subject.

Fig. 45.

The method of grafting most generally applied for larger stocks, or for plants which are already established in the open ground, is "CLEFT GRAFTING." After clearing away the soil around the collar of the stock to be operated upon, to the depth of 3 or 4 inches, select a place below the surface with a smooth exterior around the collar; just above this place cut the vine off horizontally with a fine-toothed saw, or, in the case of smaller stocks, with a sharp knife; then split the stock with a common grafting chisel, or other sharp instrument, so that the cleft will run down about 1½ or 2 inches. Insert the small end of the grafting chisel, or a narrow wedge, in the centre of the cleft in order to keep it open, and then with a very sharp knife cut your scion—which may be 3 to 4 inches long and have one or two eyes—to a long wedge-shape at the lower end, so as to fit the cleft, leaving the outer side a trifle thicker than the inner one; insert it in the cleft so that the inner bark of both stock and scion may as much as possible make a close fit on each other; then withdraw the wedge in the centre, and the scion will be held firmly in its place by the pressure of the stock. If the stock is a large one two scions may be inserted, one on each side. This mode of grafting answers for stocks varying from one-half to three inches in diameter. (See Figs. 45 and 46.)

Though not absolutely necessary with large stocks, it is best to wind the grafted plant tightly with some strong coarse string, or other suitable material, in order to bind stock and graft together. Then cover it with a grafting-clay; this clay is best made by thoroughly mixing one part fresh cowdung with four parts of ordinary tenacious clay. Grafting-wax, such as

Fig. 46.

is generally used for tree and other grafting, cannot be recommended for the grape, as the tallow and rosin seem to have a deleterious influence.

To complete the operation, replace the soil, filling it up so that the upper bud on the scion will be level with the surface. A shade placed so as to protect it from the noonday sun, or a slight mulch, is very desirable.

This method of grafting may also be employed for small stocks; when the stock is nearly the same size as the scion a perfect contact of the bark (liber) can be obtained on both sides. (See Fig. 47.)

Or two scions may also be inserted in a stock of a little larger size (see Fig. 48).

It can also be employed for grafting cuttings on cuttings (as figured in Fig. 49), though for this, and in fact for all small stocks grafted out of the ground, we would prefer the WHIP-GRAFT, or, better yet, the "CHAMPIN-GRAFT," of which we will speak later.

Fig. 47.

Fig. 48.

Fig. 49.

Another mode of cleft-grafting, which, though a little more tedious, is perhaps also that much more certain, is to *saw* a slit in the stock about one and a half inches deep with a thick-bladed or wide-set saw, instead of using the chisel. The cleft thus made must be spread open sufficient only to receive the scion, which must be cut to fit nicely in the slit, with its upper portion resting, with a square shoulder each side, on the stock. In this instance we prefer to graft with two buds, the lower one of which should be the point where to cut the shoulders. In other respects the same rules apply to this mode as those given before. The greatest advantage is that we can always make a clean straight cleft, even when the stock is gnarly or twisted.

As the slit cut by the saw is always of a uniform thickness, the scions may be prepared beforehand in the house during a rainy day or in the evening, and kept in damp moss until wanted.

We spoke before of the "WHIP-GRAFT" and the "CHAMPIN-GRAFT" as being preferable for small stocks or for cuttings grafted upon cuttings. The ordinary whip-graft (the *greffe anglaise* of the French) is well known to our horiculturists, and, probably, to most of our readers; it is this graft which is most generally employed by our nurserymen in the propagation of all small fruit trees, in making root-grafts, and it is especially convenient for grafting in-doors, for the "graft on the table" or for the "graft by the hearth-stone," as the French designate it.

In France millions of this grape-graft are made every winter, mostly on rooted plants of one year's growth, but very many also on simple cuttings of Phylloxera-resisting varieties.

The stocks and scions should both be provided in good season and kept well-preserved in sand, sawdust, moss, or other suitable material, and stowed away in a convenient place in the cellar. For this method of grafting it is very desirable, though not really essential, that the stock and scion should be as nearly as possible of a uniform size. The ordinary whip-graft, as employed for the grape, is best explained by the accompanying Figs. 50 and 51.

Fig. 50.

Fig. 51.

The improved whip-grafting, or the "Champin-graft" (*la greffe Champin*), we will describe by a free translation of that chapter of his book treating thereon:

Let us operate first on a rooted plant or a rooted internode; with the pruning shears, or better still with the knife, cut off the top as close as possible below an eye or joint at the collar. After the top has been taken off there remains but little difference between a plant and a rooted joint.* With a coarse rag wipe off all sand and grit from that portion of the shoot to be grafted. Then with a grafting-knife, which should be simple and strong, with a very thin, but wide, and not too long blade (see Fig. 52), make a nice, straight and regular

Fig. 52.

slit or cleft, from above downwards, and at one-third or one-fourth of the diameter (1¼ to 2½ inches in length), according to the size of the subject (Fig. 53). Then, holding the stock in your left hand in the manner shown in Fig. 54, with the palm of the hand turned up, cut the thickest part of the split end to an exact smooth level, of equal length as the cleft, as shown in Fig. 55.

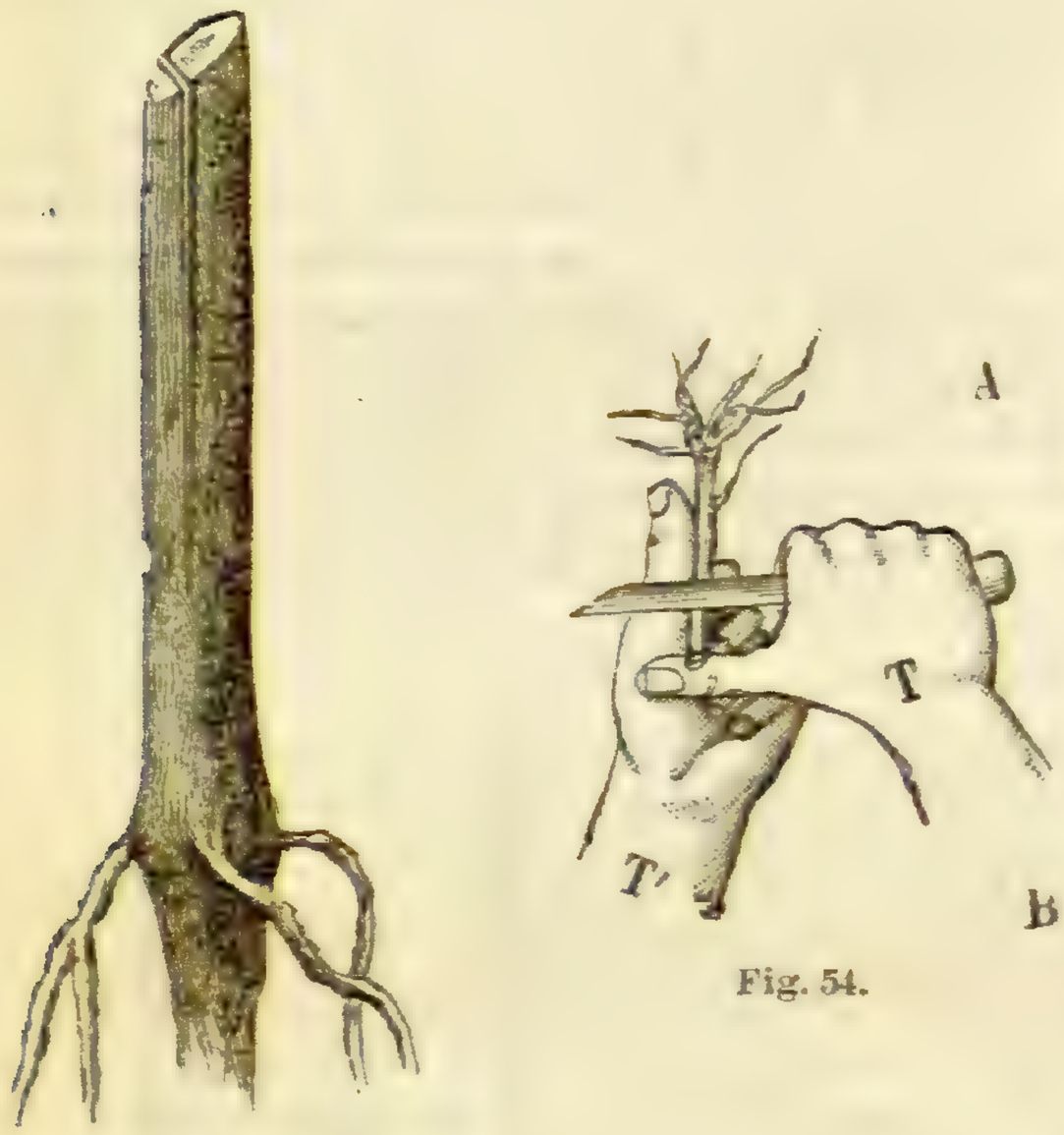


Fig. 53. Fig. 54.

Fig. 55.

Fig. 56.

This operation is not at all difficult; but, in order to perform it easily, it requires a very sharp knife, ground to a fine edge from the upper side only.

The graft or scion, which should be selected as nearly as possible corresponding in size or thickness with the stock, and generally with two eyes, is prepared, split and cut precisely in the same manner as the stock, except only, of course, that the cleft and level will be at the lower extremity instead of at the upper. (See G, Fig. 55.)

Having thus prepared both stock and scion, it is a very easy matter to unite and adjust them, as shown by Fig. 56, taking care that the bark of both fit together exactly and snugly, at least on one side.

The graft is now ready for the tie, which should be of some strong pliable material. Linden-bass is very good, but any small, strong twine will answer. In France, "Raphia," the product of a palm leaf, is used very extensively for this purpose. The tie should be adjusted firmly.

* By "rooted joints" (merithalle raciné) Mr. Champin designates portions of a cane, layered the previous summer, which has sent out roots from its different eyes or nodes. For grafting purposes, it will be seen, these rooted internodes answer all purposes if they have good strong roots, even though no top growth has pushed from the eyes which were buried in the ground.

Fig. 57 shows a well-made "Champin-graft."

It now remains to be covered with a thin but well-applied coating of grafting-clay,* and after that will be ready for planting out; or, if the operation is performed in winter, before the planting season, it may be stored in the cellar, or some other suitable place, carefully packed away in sand or sawdust.

The operation of grafting upon simple cuttings is performed in precisely the same manner. A grafted cutting is shown in Fig. 58.

The grafted cutting should be planted out in nursery rows and grown there for one season before they are set out for permanent vineyard plantation. This plan is now pursued on a very extensive scale in France.

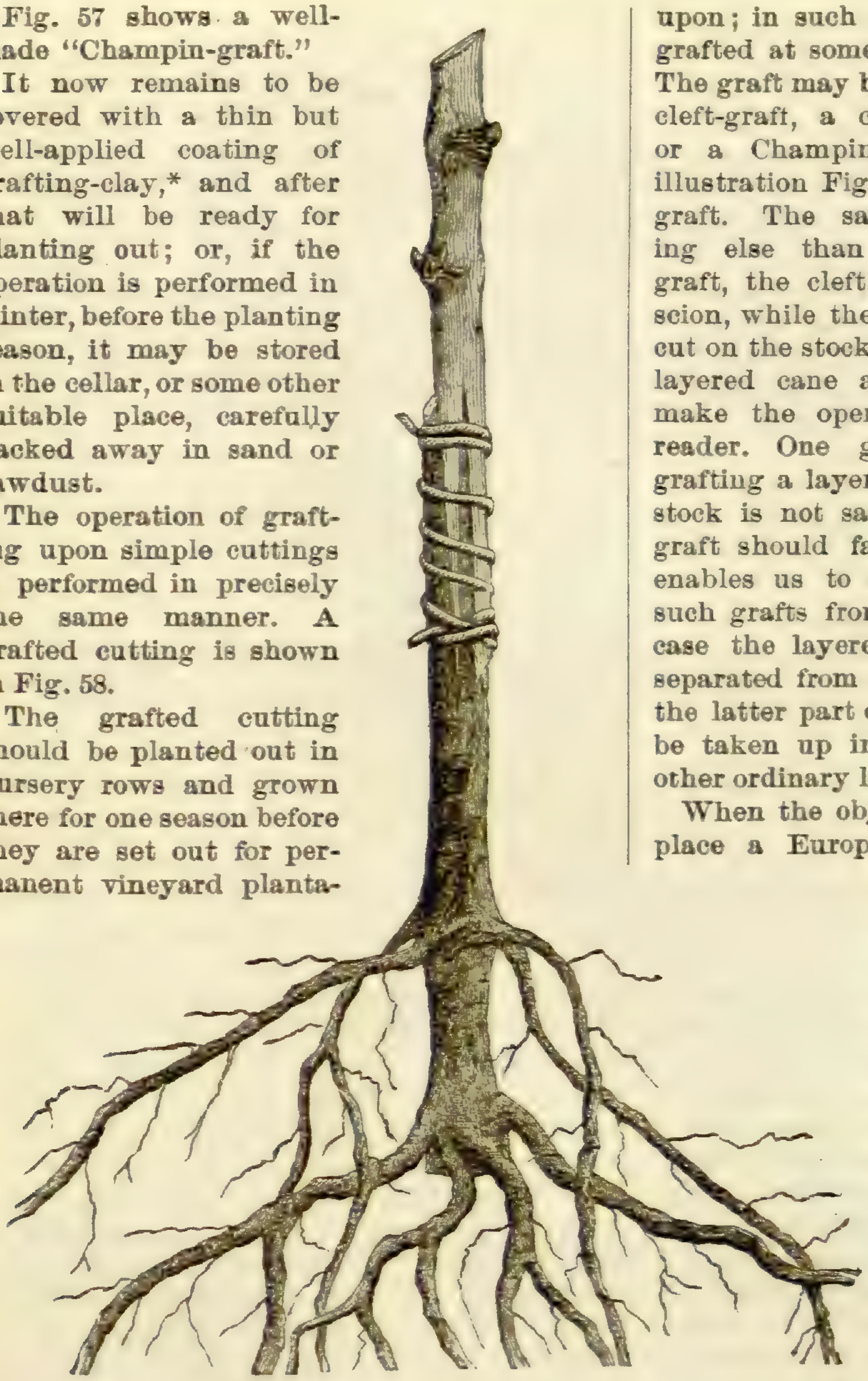


Fig. 57.

It may sometimes be desirable to graft on a layered cane; for instance, in filling a vacancy in a vineyard-row, or in cases where no good place can be obtained for inserting a graft at the collar of an old vine to be operated upon; in such cases, a thrifty young cane is grafted at some desirable point near its end. The graft may be either an ordinary cleft-graft, a common whip-graft, or a Champin-graft, or, as the illustration Fig. 59 shows, a saddle-graft. The saddle-graft is nothing else than an inverted cleft-graft, the cleft being made in the scion, while the tongue or wedge is cut on the stock. Fig. 59 shows the layered cane and graft, and will make the operation plain to the reader. One great advantage of grafting a layered cane is, that the stock is not sacrificed in case the graft should fail to grow; it also enables us to obtain a number of such grafts from one vine. In this case the layered canes should be separated from the parent stocks in the latter part of summer, and may be taken up in the fall like any other ordinary layers.

Fig. 58.

When the object of grafting is to place a European variety or a hybrid, subject to the attacks of the Phylloxera, beyond reach of harm by the insect, it is very important to place the graft as near the surface of the soil as possible, so as to prevent the scion from making ts own roots. During the first summer, the grafts should be carefully examined about once a month, and any roots which may have formed from the scion should be cut off. Where the

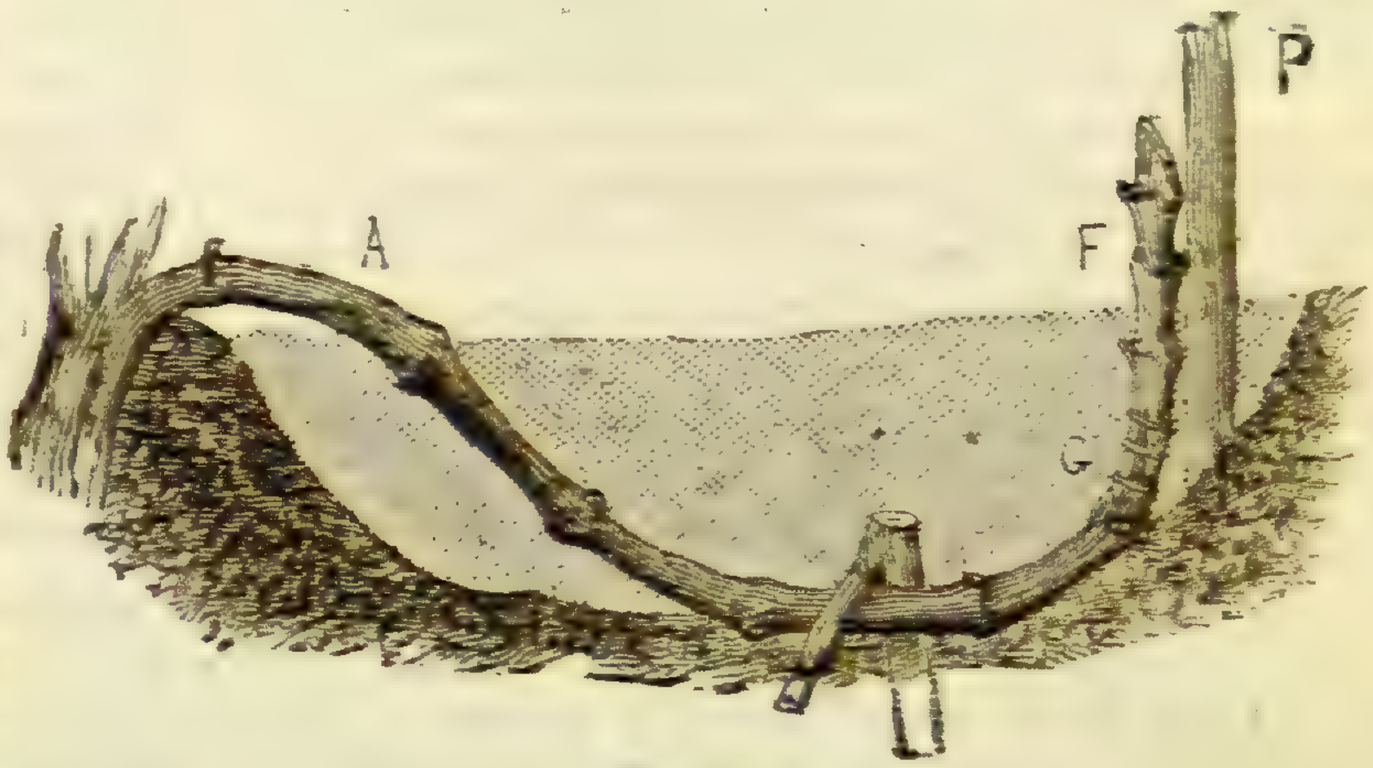


Fig. 59.

* A narrow strip of tin-foil, wound around the graft, makes an excellent substitute for grafting clay or wax If well put on, it will exclude all air and moisture. Narrow strips or bands of elastic India-rubber are also used very extensively in France; these are wound around the graft and serve at once as tie and mastic. They offer besides the great advantage that they will expand with the growth of the stock and consequently will not strangle the graft, as it is sometimes the case with other ties when not removed in time. These rubber bands should be about ⅜ to ½ inch in width.

scion is itself of a phylloxera-resisting variety, this precaution is, of course, unnecessary.

It frequently happens that the buds of the grafts swell rapidly within a few days after the operation, and then, after having given great promise for a week or two, they turn brown and apparently die off. Do not let this discourage you too quickly, and above all make no rash examinations of the cause of this seeming failure, by pulling out the scion or otherwise loosening it. A graft will often remain in this state for a period of five or six weeks, and then start up all at once with a vigor that will push young wood to the length of twenty or more feet the same season. Keep the young growth well tied up, and carefully remove all suckers from the parent stock as soon as they appear.

A method of "Green or Herbaceous grafting," which is said to give excellent results, and is extensively practiced in some parts of Hungary, especially in the grape regions around BUDA-PESTH, is described in the *Ampelographische Berichte*, January 1880, as follows: 'In the month of May, when the young shoots have not yet become woody but have already well-developed eyes at the base of the leaf, the shoot which is to be grafted is cut off close below an eye; it is then split nearly up to the eye below the cut. The scion, which has been taken from a suitable young shoot, is cut to one eye with a long, thin wedge, below which it is fitted nicely into the split. The graft is then wrapped with woolen yarn. After a few days the eye will begin to swell and grow, and after a complete union has taken place will develop shoots of a yard (over 90 centim.) or more in length, the same season. During the first winter the grafted canes should be laid down and covered, to protect them from injury by frost. The advantages of this method of grafting are, that fruit may often be obtained the first season, that several grafts can be made on the same stock, and that the operation is a very easy one; a skilled hand can easily graft one hundred and fifty or more in a day; and that it is performed at a time when other work in the vineyard is, comparatively, not very pressing.'

Another method of grafting, above the ground, is by

GRAFTING BY APPROACH OR INARCHING.

For this method it is desirable that two plants, one each of the variety which is to form the stock, and one of the scion, are planted close together, say about one foot apart. In June (the first year, if the plants make a sufficiently strong growth, if not, the second year), or as soon as the young shoots become sufficiently hard and woody to bear the knife, a shoot is taken from both the stock and the scion vine, and at a convenient place, where they may be brought in contact, a shaving is taken out from each of these, on the side next to the other, for a length of two or three inches. This must be done with a smooth cut of a sharp knife, a little deeper than the inner bark, so as to obtain on each a flat surface. They are then fitted snugly together, so that the inner bark joins as much as possible, and are wrapped securely with some old calico strips, or with soft bass strings. Besides this, it is well to place one tie a little below, and one above the grafted point, and also to tie the united canes to a stake or trellis to insure against all chances of loosening by the swaying of the wind. The rapid swelling of the young growth at this period of the year makes it desirable that the grafts be looked over after a few weeks, replacing such ties which may have burst, and loosening others which may bind so as to cut into the wood. A union will generally be made in the course of two or three weeks, which will be further consolidated in the course of six to eight weeks, when the bandages may be removed and the grafted portion left exposed to the sun, to thoroughly harden and ripen it. The shoots themselves are to be left to grow undisturbed for the rest of the season. In the fall, if a good union has taken place, the cane forming the scion is cut close *below* its union with the stock cane, which in its turn is cut close *above* the connection. Supposing the stock to have been a Concord and the scion a Delaware, we now have a vine of the latter entirely on the strong, vigorous root of the former. Of course constant vigilance must be exercised to prevent suckers from starting out of the stock. It is well to protect the grafted joint the first few winters by a slight covering of straw or soil to prevent the frost from splitting it apart.

Another mode of grafting above ground (copied from "The Gardner's Monthly" by W. C. Strong in his valuable work, "The Cultivation of the Grape") is not merely interesting in itself, but also illustrative of many othe modifications in grafting: (See Fig. 60.)

"After the first four or five leaves are formed, and the sap is flowing, you choose the place on the vine where you intend to graft. At that point wrap a twine tightly several times around the vine. This will, in a measure, prevent the return sap.

Fig. 60.

Below the ligature make a sloping cut down, as shown at *a;* also, a similar reversed one above the ligature, as at *b*, about one inch in length. In selecting a scion prefer one that has naturally a bend. Cut it so that it shall be wedge-shape at both ends, and a little longer than the distance between the cuts in the vine at *a* and *b*. Insert the scion, taking care to have the barks in direct contact, securing it with a string, *c*, bound round both scion and vine sufficiently tight to force the scion-ends into their places. If the work is done well, no tie will be required at *a* and *b*, but the joints should be covered with grafting wax. In a short time, the bud at *d* will commence its growth, after which you can, by degrees, remove all the growing shoots not belonging to the scion, and in course of the summer you may cut off the wood above *b*, and in the fall remove all above *a* on the stock, and above *c* on the scion."

We refrain from speaking of other methods of grafting, as we believe that the modes of CLEFT-grafting as well as the WHIP-graft and CHAMPIN-graft, which we have described and illustrated by plain figures, are those which give the best results, generally. The extensive grafting operations of France are mostly confined to these methods, and practical experience is the best teacher in such matters.

We also deem it unnecessary to speak of the many machines and tools lately invented for grafting; as a good pruning knife, as described, is the tool most in use, and quite satisfactory in skilled hands.

We should here mention that, generally speaking, our American varieties do not take the graft as readily and surely as the European species. A graft of *V. vinifera* on an American stock will rarely fail to grow if the operation has been properly performed; while success is not quite as certain when both, stock and scion, consist of American varieties, especially if of the hard wooded kinds. Nevertheless, when well done, at the proper season and with well conditioned wood, the operation will show a far greater percentage of success than of failure.

In our former edition we promised to experiment more largely with the grafting of European varieties on our native stocks here. We have made these experiments, and in September, 1880, we exhibited in St. Louis, at the meeting of the Mississippi Valley Horticultural Society, a number of fine foreign grapes, raised in open air, on grafted vines, in our own vineyards. But while success, in so far as protecting the European grape from the Phylloxera, has been highly satisfactory, we have found our climate, in this latitude, too unfavorable for the *V. vinifera* to encourage us for more extensive operation. Not only are our winters too severe for the *V. vinifera*, but the tendency of the latter to mildew makes their success too doubtful in all but the most favorable seasons. For our section of the United States, therefore, we would not recommend anything further than limited trials in this direction. But we think that there is a valuable field of operation for the enterprising grape-grower in some sections of the Southern States, where, under more favorable climatic conditions, the *V. vinifera*, grafted upon Phylloxera-proof native stocks, would most likely give excellent results.

PLANTING (Continued).

But now let us return to the *modus operandi* of planting. Take your vines, in a pail with water, or wrapped in a wet cloth, from the place where they were heeled-in,* to the holes; when planting, let one person shorten the *roots*, with a sharp knife, then spread them out evenly to all sides, and let another fill in with well pulverized earth. The earth should be worked in among the roots with the fingers, and pressed to them with the foot. Lay the vine in slanting, and let its top come out at the stake previously set. Then, with your knife, cut back the top to a bud just above, or even with the surface of the ground. Do not leave more than two buds on any one of the young vines which you are planting, however strong the tops, or however stout and wiry the roots may be. *One* cane is sufficient to grow, and merely to be prepared for possible accident, both buds are allowed to start. The weaker of the two shoots may afterwards be removed or pinched back.

*On receiving your vines from the nursery, they should be taken out of the box, without delay, and *heeled-in*, which is done as follows: In a dry and well protected situation, a trench is made in the soil 12 to 15 inches deep, wide enough to receive the roots of the plants, and of any required length, the soil being thrown out upon one side. The plants are then set thickly together in the trench, with the tops in a sloping direction and against the bank of soil thrown out of the trench; another trench is made parallel to the first, and the soil taken from it is thrown into the first, covering the roots carefully, filling in all of the interstices between them. Press down the soil, and smooth off the surface, so that water shall not lodge thereon. When one trench is finished, set the plants in the next, and proceed as before. When all this is completed, dig a shallow trench around the whole, so as to carry off the water and keep the situation dry.

When planted in the fall, raise a small mound around your vine, so that the water will drain off, and throw a handful of straw or any other mulch on the top of the mound, to protect it; but do not, under any circumstances, cover the vine with manure, either decomposed or fresh.

It is a well-authenticated fact that, under the action of nitrogenous agents, the grape grows more luxuriant, its leaves are larger, its product increases in quantity. But the products of vineyards so manured have an acknowledged defect—they impart to the wine a flavor which recalls the kind of manure applied. What is gained in size of bunch and berry is lost in quality and flavor. Overfeeding produces a sappy growth of soft and spongy wood, with feeble buds or eyes, which are in far greater danger of being winter-killed. Moreover, nitrogenous substances exclusively used hasten the decay of vineyards and the exhaustion of the soil, and even those authorities who favor manures in *preparing* certain grounds, or long *after* planting, mean a compost made of *old* barn-yard manure, leaf mould, broken bones, etc., laid up to rot and frequently turned; but do not allow any decomposing organic matter to come in contact with the newly planted vine.

During the first summer little else can be done than to keep the ground mellow, loose about the plants and free from weeds; stirring the ground, especially in dry weather, is the best stimulant, and *mulching* (spreading over the ground a layer of tan-bark, sawdust, straw, salt-hay, or the like, to maintain a more uniform state of temperature and moisture for the roots) is far better than watering. Do not tie up your young vines; do not pinch off the laterals; by allowing them to lie on the ground, during the *first* season, more vigorous stems will be obtained. A fair growth is about four feet the first summer. Some grape-growers prefer, however, to allow but one shoot, the strongest, to grow, and break the others off, then tie this one shoot to a stake, and pinch back the laterals to one or two leaves each. In the fall, after the foliage is all off, cut back to *two or three buds*. Cover the short cane left with a few inches of earth before the ground freezes. If any vacancies have occurred, fill out, as soon as possible, with extra strong vines, of the same variety.

During the following winter, the TRELLIS should be built. The plan adopted by most of our experienced grape growers, as possessing some advantages over other plans, especially if grapes are grown in large quantities, is as follows: Posts of some durable timber (red cedar is best) are split 3 inches thick and about 7 feet long, so as to be 5 feet in height after being set; these posts are set in holes 2 feet deep, 16 to 18 feet apart in the rows (so that either 2 vines 8 feet apart, or 3 vines 6 feet apart, are between two stakes); *three* wires are then stretched horizontally along the posts, being fastened to each post with a staple ∩, which is driven in so firmly that the wire is prevented from slipping through. The two end posts should be larger than the others and *braced* (Fig. 61), so that the contraction of the wire (in

Fig. 61.—(Four wires, 15 inches apart.)

cold weather) will not loosen them. The first wire is placed about 18 inches from the ground and the others 18 inches apart; this brings the upper wire about 4 feet 6 inches from the ground. The size of the wire used is No. 10 annealed iron; No. 12 wire is strong enough. At the present prices of wire the cost per acre will be from $40 to $60, according to distance of rows and number of wires used.

In place of the wire, slats or laths may serve the same purpose (as seen in Fig. 62), but they

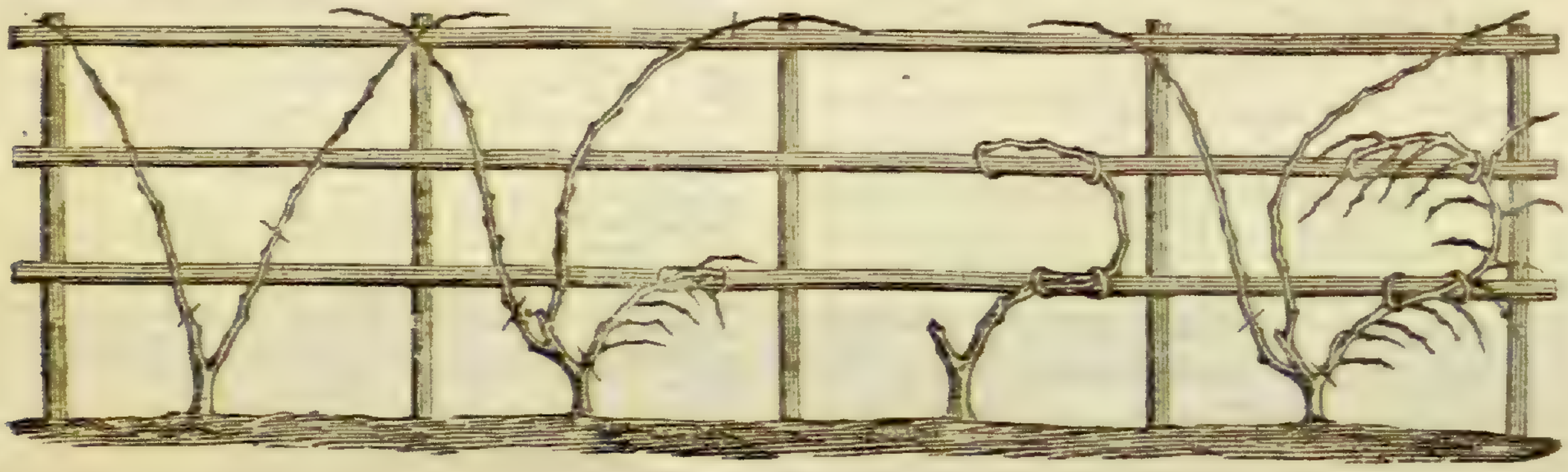


Fig. 62.

are not durable, and the posts must then be put in much closer. Another mode of making wire trellis (the Fuller plan) is with horizontal bars and perpendicular wires, as shown in a following illustration (Fig. 63). Posts of good, hard, durable wood, 3 inches in diameter and

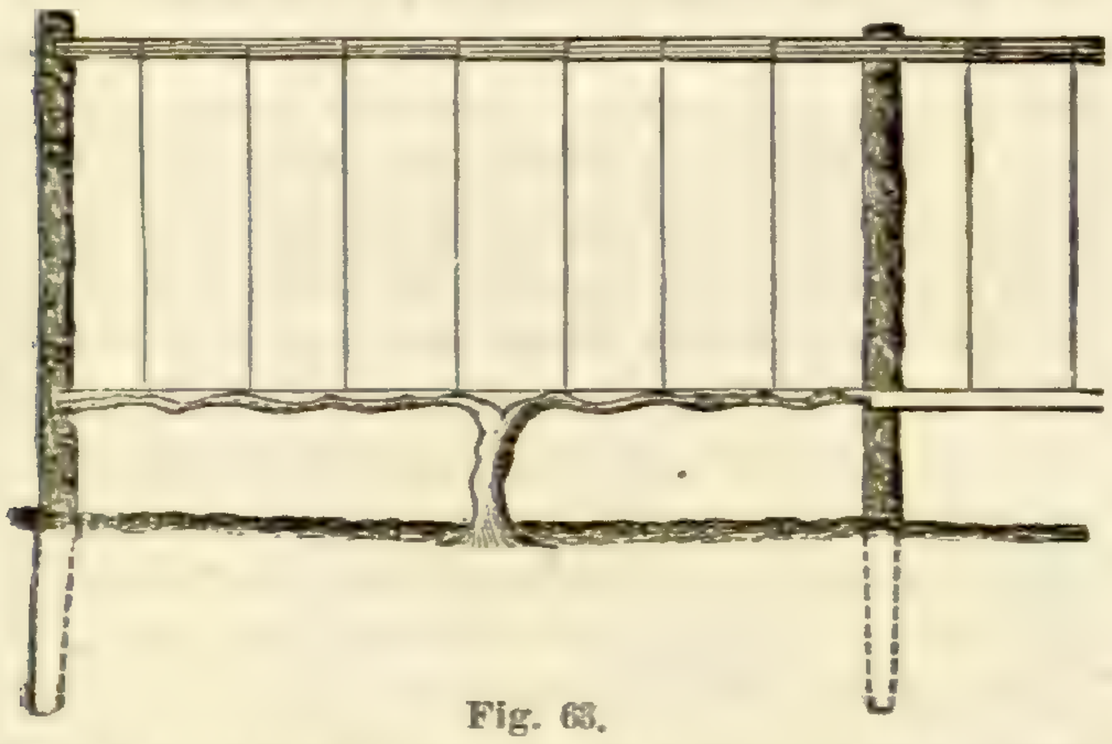


Fig. 63.

6½ to 7 feet long, are placed between the vines, at equal distance from each vine, and in a line with them, 2 feet deep in the ground. When the posts are set, nail on strips about 2½ inches wide and 1 inch thick, one strip or bar being placed one foot from the ground, and the other at the top of the posts. Then take No. 16 galvanized iron wire and put it on perpendicularly, twisting it around the lower and upper bar, at a distance of about 12 inches apart. Galvanized wire is preferable, and as a pound of No. 16 wire gives 102 feet, the additional expense is but very small. This trellis will probably cost less than one with horizontal wires, and is preferred by some. Practical experience, however, speaks in favor of horizontal wires, and a method with only two horizontal wires, the lower about 3 feet high and the upper about 5½ feet high, is gaining the good opinion of vineyardists, East and West. A good many grape growers train their vines to *stakes*, believing it to be cheaper; and the decline in the price of grapes and wine induces many to adopt the least costly plan:

Fig. 64.

This method has also the great advantage of allowing us to cultivate, plow and cross-plow the ground in all directions, leaving but little to hoe around the vines. Some use *one stake* only, as shown in Fig. 64, but with our strong growers this mode is apt to crowd foliage and fruit too much; others therefore use *two*, and, where timber is plenty, even *three stakes*, placed around each vine, about ten inches from it, and wind its canes around them spirally until they reach the top. The disadvantage of training on stakes is, that these soon rot in the ground, and must be almost annually taken out, repointed and driven into the soil, consequently require more labor, and are not as durable as trellis, unless cedar poles, or other very durable timber is used. A very simple combination of the trellis and stake system (as shown in Fig. 65) is also highly recommendable, requiring but *one* wire for the bearing canes and much lighter stakes, which need

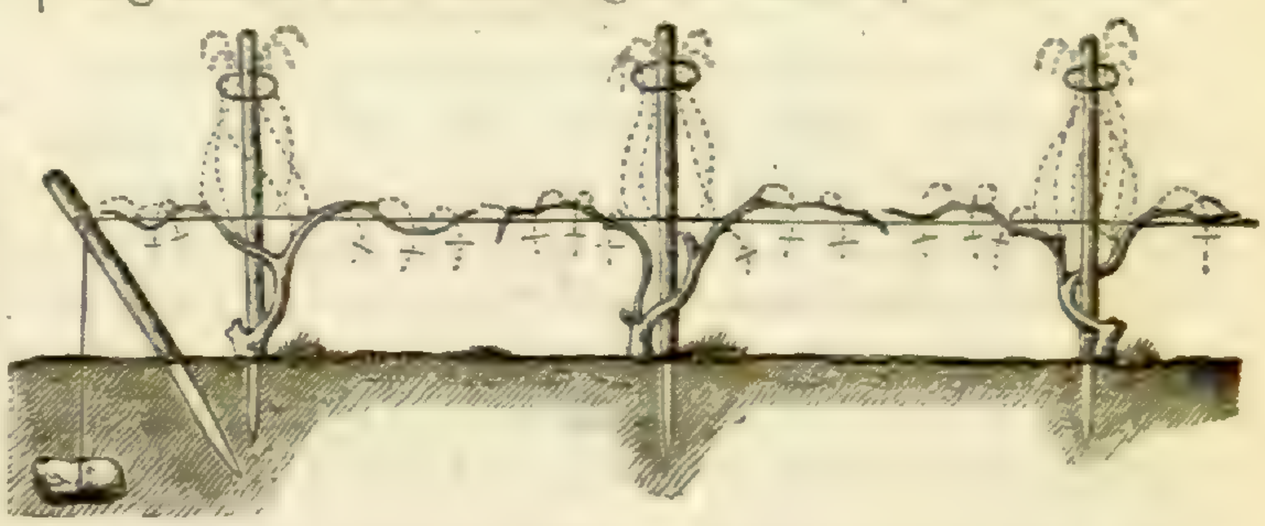


Fig. 65.

not be set as deeply into the ground as where no wire is used to hold them, and will consequently last longer; but this method does not afford the advantage of cross-plowing.

To secure this advantage and at the same time to give to our strong growers more space and the benefits of high training, we made a kind of "*Arbor Trellis*" in one of our vineyards (Fig. 66), the construction of which is more expensive on account of the necessary high posts (of which the end-posts only need be quite strong) and of the wire; but the productiveness and probable exemption from diseases is also greater in proportion. By this method the ground might also be used for grass culture, and summer-pruning and tying is almost entirely dispensed with. The fruit-gathering is, however, less convenient, and none but quite hardy, vigorous varieties should be thus trained.

Fig. 66.

Some people believe that we could even dispense with both trellis and stakes entirely, and urge the adoption of the "Souche" or "Buck Pruning" plan, used in parts of France and Switzerland, but quite impracticable for our strong growing species in this climate.

Another mode of cultivation, which our G. E. Meissner had occasion to see in Italy, seems more applicable to many of our hardy American varieties: it is the cultivation of the vine on living trees instead of trellis or stakes. The tree principally employed for this purpose is the *Acer campestris*, a species of maple. The trees are planted at the age of two to four years, when they are about four to five feet high. They are planted in vineyards at a distance of about 12 feet each way, some planting also with a wider space between the rows, and cultivating the intervening space with other crops. At the same time with the trees are planted the vines, which are set in the rows about midway between the trees. The vines and trees are both well cultivated, so as to induce a rapid and healthy growth. At the end of the season the vines are cut down to two eyes above the ground, and the second season one or two strong canes are grown from them and carefully tied up to temporary stakes. At the end of the second season, or as soon as the vine has attained a sufficiently strong growth of cane, it is laid down in a trench, about eight or ten inches deep, to the tree; the trench is covered in, and the canes shortened back, so that only two eyes of the vine project at the immediate base of the tree. It is now ready for training up on the tree, the roots of which do not interfere with its growth, as the main feeding-roots of the vine are at a sufficient distance therefrom. The layered cane will also throw out new roots on its entire length and thus induce an extra strong growth. The trees are generally allowed to branch out at a height of five to six feet, and it is at this height, also, that the new head of the vine will be formed on one or more permanent main stems trained up from the bottom. The after-system of pruning and cultivation differs but little from ordinary vineyard culture. The trees also receive an annual cutting back, so as to keep the head open and within bounds, and, if necessary, some shoots and leaves are removed in the summer to admit air and light. Once that the vine has reached its hold among the forks of the tree, but little tying is necessary afterwards, the branches and twigs affording plenty of support and holding to the tendrils.

Those who know the cost of grape-stakes and trellis, and the constant expense and trouble of repairs and renewals which their entertainment requires, will appreciate the advantages which such a plan would offer, if it can be successfully applied in this country. The main difficulty seems to be in finding the proper kind of tree to use in place of *Acer campestris*, which we do not find here. The important points to be observed in the selection of the tree seems to us to be a quick growth in the first years, yet not a naturally large grower—a tree that will shed its foliage tolerably early in the fall, and especially one that is not a gross feeder.

If you have covered your young vines last fall, remove the earth from over them at the approach of spring, as soon as danger from frost is past; *then cultivate the whole ground*, plowing *between the rows* from four to six inches deep, and carefully hoeing around the vines with the two-pronged German hoe or *Karst*, or *Hexamer's pronged hoe*. The ground should thus be broken up, inverted, and kept in a mellow condition *continually; but do not work the ground when wet!*

During the *second summer* a cane or shoot is produced from each of the two or three buds which were left on the young vine last fall. Of these young shoots, if there are three, leave only the two strongest, tying them neatly to the trellis, and let them grow unchecked to the uppermost wire.

With the strong-growing varieties, especially where we intend to grow the fruit on laterals or spurs, the two main canes are pinched off when they reach the second horizontal wire, whereby the laterals are forced into stronger growth, each forming a medium-sized cane, which is shortened in the fall from four to six buds. One of the two main canes may be layered in June, covering it with mellow soil, about an inch deep, leaving the ends of the laterals out of the ground. These will generally make good plants in the fall for further plantations; with varieties which do not grow easily from cuttings, this method is particularly desirable. Fig. 67 shows the vines tied and pruned, accordingly, at the end of the

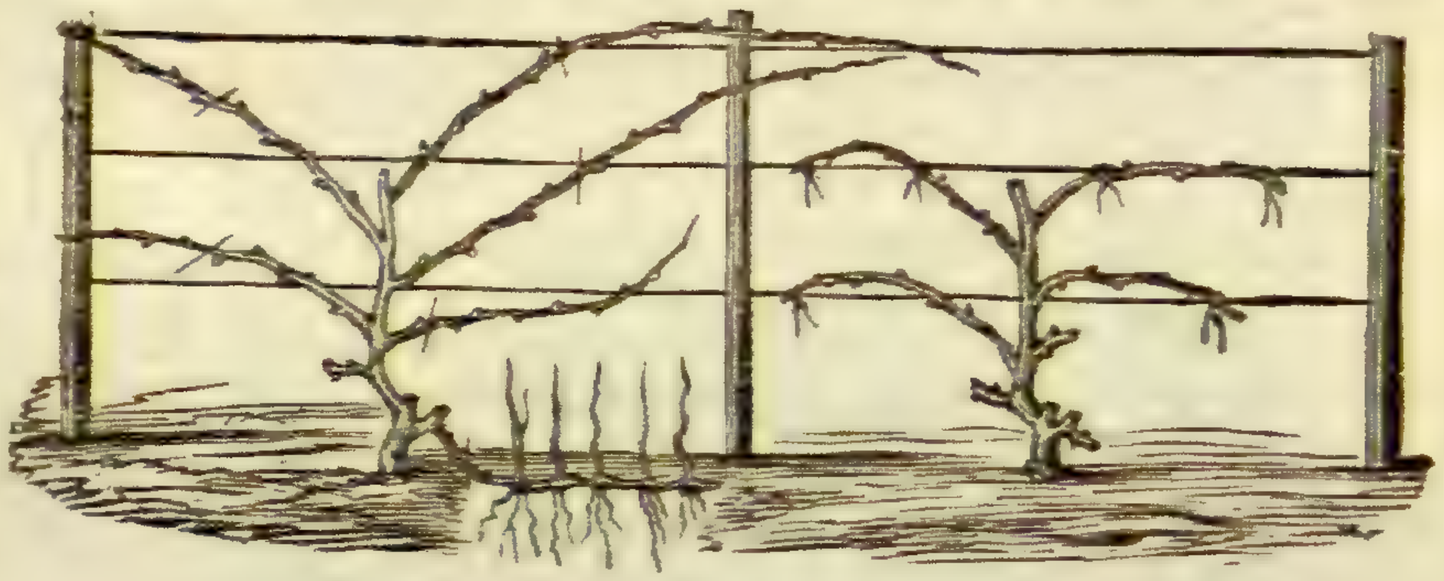


Fig. 67.

second season (the cross lines through the canes showing where they are cut off or pruned).

Another good mode of training, recommended by Fuller, is to bend down in fall, at the end of the second season, the two main canes of the vines (the laterals of which have been pinched back to concentrate the growth into these main canes) in opposite directions, laying and tying them against the lower wire or bar of the trellis, as shown in Fig. 63, and shortening them to four feet each. Then let five or six of the buds on the upper side of the arms be grown into upright canes. (See Fig. 68.) All buds and shoots not wanted for upright canes should be rubbed or broken off. This latter method is not well adapted for varieties which require covering in winter. Where the canes are started lower, near the ground, and cut loose from the wire, they can be easily covered with earth.

Fig. 68.

At the *commencement of the third season* (uncover and) tie the canes to the trellis. For tying, any soft string or stout woolen yarn, the shreds of old gunnies, may be used; some obtain their tying material from basswood-bark, soaked for two weeks or longer in running water. Others plant the Golden Willow, and use its small twigs for tying purposes. Tie closely, and as young canes grow keep them tied, but, in all cases, take care against tying too tightly, as the free flow of sap may be obstructed.

The ground is now plowed and hoed again, as before. One (6″) deep plowing in spring, taking care, however, not to cut or tear the roots of the vines, and two more shallow (3″ or 4″) plowings in summer. From each of the buds left at the last pruning (as shown in the preceding figures), canes can be grown during the third year, and each of these canes will probably bear two or three bunches of fruit. There is danger of their being injured by overbearing, on which account the bunches should be thinned out by taking away all imperfect bunches and feeble shoots. In order to secure future fruitfulness of the vine, and at the same time to keep it in our convenient control, we should allow no more wood to grow than we need for next seasons' bearing, and for this purpose we resort to *spring pruning*, generally, though improperly, called

SUMMER PRUNING.

The time to perform the first summer pruning is when the young shoots are about six inches long, and when you can plainly see all the small bunches—the embryo fruit. We commence at the two lower spurs, having two buds each, and both started. One of them we intend for a bearing cane next summer, therefore allow it for the present to grow *unchecked*, tying it, if long enough, to the lowest wire. The other, which we intend for a spur again next fall, we pinch with the thumb and finger to just beyond the last bunch or button, taking out the leader between the last bunch and the next leaf, as shown in Fig. 69, the cross line indicating where the leader is to be pinched off We now come to the next spur, on the opposite side, where we also leave one cane to grow unchecked, and pinch off the other.

We now go over all the shoots coming from the arms or laterals tied to the trellis, and also pinch them beyond

Fig. 69.

Fig. 70.

the last bunch. Should any of the buds have pushed out two shoots, we rub off the weakest; we also take off all barren or weak shoots which may have started from the foot of the vine.

The bearing branches having all been pinched back, we can leave our vines alone until after the bloom, only tying up the young canes from the spurs, should it become necessary. Do not, however, tie them over the bearing canes, but lead them to the empty space on

both sides of the vine, as our object must be to give the fruit all the air and light we can without depriving it of the necessary foliage, which is of greatest importance for the formation of sugar in the berries. To do so the leaves must be well developed and healthy. Diseased, mildewed foliage, however, will not promote the sugar formation, but rather impede the same.

By the time the grapes have bloomed, the laterals will have pushed from the axils of the leaves on the bearing shoots. Now go over these again, and pinch each lateral back to one leaf, as shown in Fig. 70. In a short time the laterals on the fruit-bearing branches which have been pinched, will throw out suckers again. These are again stopped, leaving one leaf of the young growth. Leave the laterals on the canes intended for next years' fruiting to grow unchecked, tying them neatly to the wires with bass or pawpaw bark, or with rye straw.

If you prefer training your vines on the horizontal arm system (Fig. 68) the mode of summer pruning will in the main be the same. Pinch off the end of each upright shoot *as soon* as it has made two leaves beyond the last bunch of fruit; the shoots after being stopped will soon start, and after growing a few inches should be stopped again, as we wish to *keep* them within the limits of the trellis, and the laterals should be stopped beyond its first leaf. Thus we try to keep the vine equally balanced in fruit, foliage and wood. It will be perceived that fall pruning, or shortening-in the ripened wood of the vine, and summer pruning, shortening-in and thinning out of the young growth, have one and the same object in view, namely, to keep the vine in proper bounds, and concentrate all its energies for a two-fold object, namely, the production and ripening of the most perfect fruit, and the production of strong, healthy wood for the coming season's crop. Both operations, in fact, are only different parts of one and the same system, of which summer pruning is the preparatory, and fall pruning the finishing part; but while the vine will bear, without apparent injury, any reasonable amount of pruning during its dormant state, in the fall or winter, any severe cutting during the summer, is an unmitigated evil. G. W. Campbell, the well-known horticulturist says: "All the summer pruning I would recommend, would be the early rubbing out of superfluous shoots, upon their first appearance; leaving only what is required for next year's bearing wood. This with the pinching or stopping the ends of such shoots or canes as were disposed to be too rampant in growth, would be all I would ever consider necessary. Some of the most successful grape growers within my knowledge carefully prune their vines in fall or early spring, and then leave them entirely without summer pruning." The importance of this matter is so great that we subjoin—

HUSMANN'S METHOD OF SUMMER PRUNING.

[Extract from the "Grape Culturist," Nov., 1870.]

Without proper and judicious summer pruning, it is impossible to prune judiciously in the fall. If you have allowed six to eight canes to grow in summer where you need but two or three, none of them will be fit to bear a full crop, nor be properly developed. We prune longer in fall than the majority of our vintners, which gives a double advantage; should the frost of winter have injured or killed any of the first buds, we still have enough left; and should this not be the case, we still have our choice to rub off all imperfect shoots, to reduce the number of bunches at the first pinching, and thus retain only strong canes for the next years' fruiting, and have only large, well developed bunches.

But to secure these advantages we have certain rules, which we follow strictly. We are glad to see that the attention of the grape growers of the country is thoroughly aroused to the importance of this subject, and that the old practice of cutting and slashing the young growth in July and August is generally discountenanced. It has murdered more promising vineyards than any other practice. But people are apt to run into extremes, and many are now advocating the "let-alone" doctrine. We think both are wrong, and that the true course to steer is in the middle.

1. Perform the operation EARLY. Do it as soon as the shoots are six inches long. At this time you can oversee your vine much easier. Every young shoot is soft and pliable. You do not rob the vine of a quantity of foliage it can not spare (as the leaves are the lungs of the plant and the elevators of the sap). You can do three times the work that you can perform a week later, when the shoots have become hardened, and intertwined by their tendrils. Remember that the *knife* should have nothing to do with summer pruning. Your thumb and finger should perform all the work, and they can do it easily if it is done early.

2. Perform it *thoroughly and systematically.* Select the shoots you intend for bearing wood for next year. These are left unchecked; but do not leave more than you really need. Remember that each part of the vine should be thoroughly ventilated, and if you crowd it too

much none of the canes will ripen their wood as thoroughly nor be as vigorous as when each has room, air and light. Having selected these, commence at the bottom of the vine, rubbing off all superfluous shoots, and all which appear weak and imperfect. Then go over each arm or part of the vine, pinching every fruit-bearing branch above the last bunch of grapes, or, if this should look weak or imperfect, remove it and pinch back to the first perfectly developed bunch. Should the bud have pushed out two or three shoots, it will generally be advisable to leave only the strongest, and remove the balance. Do not think that you can do part of it a little later, but be unsparing in taking away *all* you intend to take this time. Destroy all the caterpillars and all the insects you find feeding on the vines, and the steel-blue beetle, as it will eat into the buds. But protect the lady-bug, mantis, and all the friends of the vine.

After the first pinching, the dormant buds in the axils of the leaves, on fruit-bearing shoots, will each push out a lateral shoot opposite the young bunches. Our second operation consists in pinching each of these laterals back to *one* leaf *as soon* as we can get hold of the shoot above the first leaf, so that we get a young vigorous leaf additional opposite to each bunch of grapes. These serve as elevators of the sap, and also as an excellent protection and shade to the fruit. Remember, our aim is not to rob the plant of its foliage, but to make *two* leaves grow where there was but *one* before, and at a place where they are of more benefit to the fruit. By our method, our rows of vines have the appearance of leafy walls, each bunch of the fruit properly shaded, and yet each part of the vine is properly ventilated.

After the second pinching of the fruit-bearing branches, as described above, the laterals will generally start once more, and we pinch the young growth again to one leaf, thus giving each lateral two well-developed leaves. The whole course should be completed about the middle of June here and whatever grows afterwards should be left. In closing, let us glance at the *objects* we have in view:

1. To keep the vine within proper bounds, so that it is at all times under the control of the vintner, *without weakening its constitution by robbing it of a great amount of foliage.*

2. *Judicious thinning of the fruit* at a time when no vigor has been expended in its development.

3. *Developing strong, healthy foliage* by forcing the growth of the laterals, and having *two* young, healthy leaves opposite each bunch, which will shade the fruit and serve as conductors of the sap to the fruit.

4. *Growing vigorous canes for next year's fruiting and no more*, thereby making them stronger; as every part of the vine is thus accessible to light and air, the wood will ripen better and more uniformly.

5. *Destruction of noxious insects.* As the vintner has to look over each shoot of the vine, this is done more thoroughly and systematically than by any other process.

FALL OR WINTER PRUNING.

This may be performed at any time, during mild days, while the vine is in a dormant state, generally from November to March, but should be done at least a week before vegetation is likely to commence. Tender varieties should not be allowed to pass through our sometimes severe winters without the protection afforded by a mulch of litter, leaves, earth, or other covering, to prevent injury from alternate freezing and thawing; the vines which are not hardy must therefore be pruned in November, when they are simply laid down on the ground and mulched lightly, to be uncovered again in spring, just *before* they are ready to put forth new growth from their swelling buds. Farther north, the practice of covering up the vines, both tops and roots, is recommendable also with the hardy varieties.

Different varieties will require somewhat different treatment; some varieties (strong growers) will fruit better if pruned to spurs on old wood than on the young canes, retaining the old canes and pruning the *healthy*, strong shoots or laterals they have to two buds, whereas others (only moderate growers) will flourish and bear best when pruned short and to a cane of last year's growth.

The observing vintner will find some hints in our descriptive catalogue, but only by practice and experience can he learn the best method for each variety.

The following correct views on this subject are from the "Grape Culturist," Nov., 1870:

"Some varieties will bear more readily and larger bunches upon the laterals of the *young* canes, some upon the spurs of a few eyes on *old* bearing branches, and some will fruit readily upon the principal canes. This should govern you in pruning.

"Most of the *strong growers* of the Labrusca species (Concord, Hartford, Ives, Martha, Perkins, etc.), as well as some of its more vigorous hybrids (Goethe, Wilder, etc.), and especially some Æstivalis (Herbemont, Cunningham, Louisiana, Rulander), *will fruit best on the late-*

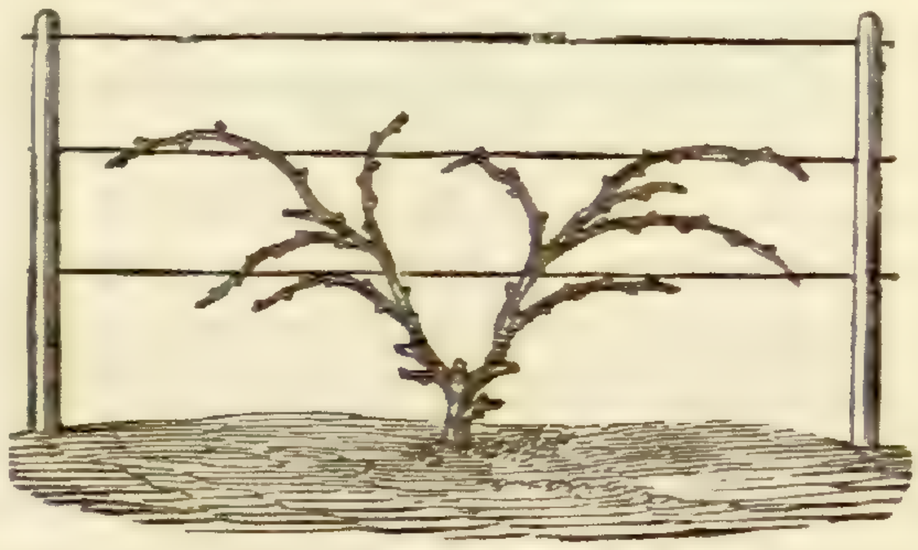
rals of the young canes of last summer's growth provided they are strong enough, which they will be if they have been pinched according to our directions; the fruit-buds at the base of the principal canes are seldom well-developed, and will not bring much fruit. We therefore grow the fruit on the laterals, which can be shortened in to from two to six eyes each, according to their strength. All these rank growers should have plenty to do—that is, they should be pruned long, much longer than is generally done. Should too many bunches appear, you can easily reduce the number at the first pinching. All the Cordifolia*, and some of the Æstivalis class (Cynthiana and Norton's Virginia), *produce best on spurs on two or three year old canes;** they will also bear better on spurs on laterals than on main canes, but do not produce their best fruit until they can be "spurred in" on old arms. For this purpose, select for your spurs strong, well-ripened shoots; cut them back two to three eyes each, and cut out all the small and imperfect ones. You may leave from thirty to fifty buds, according to the strength of your vine, and always bear in mind that you can reduce the number of bunches when summer-pruning.

"A third class produces readily and abundantly from the main canes. This comprises the varieties which do not grow very strong, the more *tender Labrusca,* and all of more or less *Vinifera* characteristics, viz.: the Alvey, Cassady, Creveling, Catawba, Delaware, Iona, Rebecca. These will produce best on short canes of say six eyes; short pruning and the old renewal plan may be as good as any for them. There is also much more danger of overtasking *this class* than both of the others, and *they* should never be allowed to bear too much."

From the above it will be seen that *different methods* apply to different varieties, and we may add that they ought also to be modified according to other circumstances. Those, therefore, who have recommended various and contradictory systems of training and pruning may each have been right; but were wrong in believing their preferred method the only correct method *in all cases*, or equally well adapted for all species and varieties of grapes. Bearing this in mind, the intelligent vintner will soon learn how far one or the other system is best applicable in his case.

SUBSEQUENT MANAGEMENT.

We may now consider the vine as fully established, able to bear a full crop, and, when tied to the trellis in spring, to present the appearance as shown in Fig. 71.



(Fig. 71.)

The operations are precisely the same as in the third year, with this important difference, however, that the plowing should be shallow; as soon as vines have become established, the cultivator should be used for the destruction of weeds and keeping the surface-soil mellow. The hoe will be needed to kill the weeds immediately around the plants, as before. At the last plowing in the preceding fall the furrow-slice should have been thrown TOWARDS the vines, thus affording additional protection to the roots—also facilitating the laying down and covering of the canes, if necessary Top dressings of lime, ashes, bonedust, &c., may, if needed, be best applied at the same time. In the following spring, therefore, the first plowing should be reversed, and the ground will be level.

Plowing in the vineyard should never be so deep as to injure the roots of the vines.

If you train your vines on the horizontal system, the upright canes, which were pruned back to two buds each, will now produce two shoots each. If more than one shoot should proceed from *each* of these *two* buds, or if other shoots should start from small buds near the arms, only the strongest one should be allowed to grow, and all others rubbed off. Instead of ten to twelve upright canes, you will have twenty to twenty-four, and, allowing three bunches to each, you may get seventy bunches to every vine the fourth year after planting. These canes are now to be treated the same, as regards stopping, pinching laterals, etc., during each subsequent year of their growth.

There are many other modes and systems of training, but the same general rules and principles prevail in nearly all.

There is one well authenticated fact in the fruiting of the grape, viz: that the finest fruit, the best, earliest and largest crops are produced upon the strongest shoots of the previous years' growth. The only proper system of pruning will therefore be that which encour-

* Now classified as *Riparia*, or its crosses, as *Taylor*, &c.

ages and secures an abundance of such shoots. By this general principle all new systems, so called, should be proved, and beginners in grape culture may be able to guard against receiving false impressions with reference to any mode which may fall under their observation; and this caution is the more necessary as young vines will bear good crops for a *few* years, even under very indifferent treatment. In all sytems of training which involve the retention of wood beyond five or six years, as in the case of spur pruning, and the methods with permanent horizontal branches, it is absolutely essential to remove the older wood at certain periods, and replace it with younger wood from near the base of the plant. Fixed rules can hardly be given for an operation which requires so much thought and such close acquaintance with the growth and bearing habits of the different varieties.

If you desire to train your vines *for arbors* or on walls, set an extra strong young plant, in rich, well-prepared soil; leave but one shoot to grow during the first summer, and if necessary even during the second, so that it may get very strong. Cut back to three eyes in fall, these will each throw out a strong shoot, which should be tied to the arbor they are designed to cover, and allowed to grow unchecked. These three canes will be cut back in the fall following, to three buds each, which will give us three principal branches, each producing canes the third or fourth season; of each of these branches, cut next fall one cane to two eyes, and the others to six or more buds, according to the strength of the vine, then gradually increase the number of branches and cut back more severely those which fruited. In this manner a vine can be made in the course of time to cover a large space, produce a large quantity of fruit, and get very old.

Those who desire further information and directions on various modes of pruning and training, or on the culture of grape vines in glass houses, we refer to Chorlton's Grape Growers' Guide; Fuller's Grape Culturist; Hoare's Cultivation of the Grape-vine on open Walls, and other books on Grape Culture, especially to an article on Pruning and Training the Grape-vine, by Wm. Saunders, U. S. Department of Agriculture. Report, 1866.

DISEASES OF THE GRAPE-VINE.

The vine, with all its vigor and longevity, is no less subject to diseases than all other organic bodies, and as we cannot remove most of their causes, and can even with the best care prevent and cure but few, our first attention must be given to the selection of healthy plants and hardy varieties. You have already been warned against planting the Grape-vine in heavy, wet soil, where water stagnates, or in places exposed to early and late frosts. You have been impressed with the necessity of clean cultivation, stirring the soil,* of proper training, and of thinning the fruit. If you disregard these points, even the healthiest and most vigorous varieties of vines will become diseased.

But some of the diseases infesting our American grapes do not result from defects in the soil or want of cultivation; their causes are in fact unknown, except that they are produced by fungi—microscopic parasitical plants, producing mildew, etc., of which there exist a great many different kinds, and about which our knowledge is as yet very deficient. We do know, however,—alas, too well,—that these diseases exist, are promoted by atmospheric influences—unfavorable state of the weather—and seem as much beyond our control as the weather itself. The most formidable of these diseases, most prevailing in this country, and most disastrous to American grape culture, are, THE MILDEW (*Peronospora viticola*) and THE ROT OR BLACK ROT (*Phoma uvicola*).

[The first scientific description and proper distinction of the two kinds we find in the Transactions of the Academy of Science of St. Louis, 1861, by Dr. Geo. Engelmann (Vol. 2, p. 165). See also Am. Pomological Society, Session 1879, p. 41-48.]

Just before going to press we are favored by DR. GEO. ENGELMANN, with the following article on this most important subject:

THE DISEASES OF GRAPE-VINES

are principally occasioned by animal or vegetable parasites. I leave others, who are more conversant with the subject, to treat of the former, and will merely state here that our species have all grown up with the Phylloxera, and would long ago have been extinguished, or rather never could have lived, if that insect had such power over them; but they as well as the insect live on, the latter having no other nourishment than the grape-vines and their roots: you may call it an accommodation between them.

More important for us in America are the fungus diseases, which do our grape crops more harm than the Phylloxera. It is said that in Europe they have dis-

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* We are aware of the fact that in certain seasons and peculiar soils neglected vineyards, filled with grass and weeds, have escaped diseases and borne full crops, while well hoed and cultivated vineyards suffered severely, especially from *rot*; but the rule, nevertheless, holds good in general. After a season of severe drouth, for instance, fall plowing may cause the evaporation of the scanty remaining moisture in the loosened soil and render the exhausted roots a prey to severe frosts, while the unplowed, baked surface would serve as a protection against both. Such exceptions have misled some grape-growers to advocate non-cultivation, or even grass-sowing, in their vineyards; but after a few years a stunted growth and unproductiveness of their vines was the result.

covered over 200 kinds of fungi which live on the different parts of vines, but fortunately only a few of them are really injurious. These are, above all, the mildew of the leaves and the black rot of the berries. In Europe besides our mildew, which has lately been introduced, they have the Oïdium and the Anthracnose.

The *Mildew*, *Peronospora viticola*, appears in frost-like white spots on the under side of leaves, hairy as well as glabrous ones, and may generally be observed here in Missouri from the beginning of June, fostered by the sultry and damp or wet weather, usual at that season; in the Eastern States it seems to come on later in summer and in the fall. Though most common on the leaves, it sometimes also infests the petioles of the leaves, the stems of the bunches, and the very young berries. But, even if it does not attack the latter, the effect on the leaves alone, which turn brown in spots and are eventually partially or completely killed, destroys the fruit, the berries shrivelling *from the base*, turning light brown without falling off. This is here sometimes termed "brown rot."

The fungus at first pervades the cellular tissue of the leaf; then, a few days later, the minute fungus stems protrude through the stomats (breathing pores) of the lower surface, forming little upright branching plantlets, which might be compared to a miniature spruce tree, singly not visible to the naked eye; at the end of the branchlets they bear the summer spores (*conidia*), which mature, are discharged, spread by wind or otherwise, and, when moistened, germinate with astonishing rapidity. Late in the season the fungus produces what are called the resting spores (oospores) in the interior of the leaf-tissues, and, while the others propagate the parasite in summer, these larger and more enduring ones keep alive through winter and insure its growth in the following summer. Thus it is seen that the dead mildewed leaves, containing the resting spores, really do preserve the germs for the next season's mildew. These leaves ought to be destroyed by carefully gathering and burning them, or by burying them *deeply* in the ground. The direct destruction of the fungus has been often attempted, and by different means, especially by sulphur-sprinkling, but without any marked effect; a dry spell of weather, however, arrests it most effectually for the time being.

The *Peronospora* has since 1878 made its appearance in Europe—like the Phylloxera, accidentally introduced from this country—and has added another terrible infliction on the wine-growers there, threatening to be worse than the Oïdium, which years ago used to decimate the grape crops of Europe.

A few words about this *Oidium* may be in place here. This is a mildew-like fungus which appears on the *outside* of the *upper* surface of the vine-leaves, and bears its fewer spores on smaller, not much branched, stemlets: it destroys the vitality of the leaves, and with it the crop, just as our mildew does. Its resting spores are unknown and with its life-history we are not so well acquainted, but we know that sulphur sprinkled over the leaves will destroy it. It made its first appearance, as far as it is known, about 1845, in graperies at Margate, near London, and spread rapidly and destructively over a great part of Europe and the islands, especially Madeira, where grape culture was almost annihilated by it; but it seems now to be less common or less injurious than it was years ago, and may possibly have run its course, just as other epidemics are apt to do. It is unknown where it originally came from; some suppose that it originated in America, but it has never appeared here in the form under which it is known in Europe; whether in another form, is still questionable among our best mycologists; at all events we have thus far only one destructive form of mildew here, the *Peronospora*.

The second great fungus pest of our vineyards is the *Black Rot*, *Phoma uvicola*. On the berries, but never on the leaves or stems, generally about the time that they are full grown, in July or August, very rarely on half-grown berries in June, a light brown spot with a darker central point is observed on the side and not near the stem; this spot spreads, and darker, shining nodules or pustules, plainly visible with the naked eye, begin to protrude above the epidermis; at last the whole berry shrivels up, turns bluish-black, the pustules roughen the surface, and each one opening at its top emits a whitish worm-like thread, which consists of innumerable spores glued together with a mucilaginous coating. In this condition the spores are inert, but rain will dissolve the mucilage and liberate and wash down the spores, or they will fall to the ground with the dead berries. What then becomes of them, whether they enter the soil, or how they propagate the fungus, is as yet unknown. At all events it seems advisable to gather all the affected berries, if such a thing can be done, and destroy them.

In Europe they have another fungus disease of the grape, called in Germany *Brenner*, in France *Anthracnose*, and described under the name of *Sphaceloma ampelinum*, which by some authorities has been supposed to be another form of development of our Black Rot, above described; this, however, seems very doubtful. We have, as it seems, never had the *Sphaceloma*,* nor they the *Phoma*. The former attacks all the green parts, leaves, young stems, or green berries, and forms open wounds which might be compared to ulcers; while our *Phoma* is restricted, as far as known, only to green berries, without breaking up the tissues or forming ulcers. The *Sphaceloma* seems to be an old disease in Europe, already known in the last century. Mycologists are now carefully studying these questions.

Had we known that we would be favored with the above article on the Diseases of the Grape-vine by so great an authority as Dr. Engelmann, we would have omitted some of the following lines, previously written by ourselves, in preparing this new edition of our Catalogue. This circumstance and the importance of the subject will excuse what may seem a repetition; and while the preceding will stand as the description of the fungus diseases by the scholar, the following may not be unwelcome as the practical grape-growers' views.

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* Unfortunately we have of late, also, the *Sphaceloma* in our vineyards. How or whence it came, we do not know; but, having observed the *Anthracnose* in France, we could not help recognizing the same here;—fortunately, so far, to no serious extent.

VITICULTURAL REMARKS.

The *American** MILDEW (*Peronospora viticola*) first presents itself in the form of spots resembling a small accumulation of powdered sugar, not larger than a lentil, on the *underside* of the leaf; but imperceptibly these spots extend and join until they cover a larger portion of the entire lower face of the foliage. Later still, the centers of attack dry up and take the color of brown or dead leaves, so that these mildewed, shrivelled, dried-up leaves are often confounded with or taken for "*sun-scald*"; but on closer observation mildew can easily be distinguished from sun-scald. If the effect of the latter, there is no white powdery mushroom vegetation visible on the lower face of the leaf. Mildew mostly attacks the foliage, sometimes also the young green stems; rarely the small, young, never the full-grown, ripening berries.

The important difference between *Perenospora* (the Am. mildew) and *Oïdium* (the European mildew) is not only that Perenospora appears on the lower, while Oïdium appears on the upper surface, but that the former penetrates the entire tissue of the leaf, while Oïdium grows on its upper surface only. Humidity and dryness exert a preponderating influence on the development of the disease; rain, dew, even fog, favor the spread and germination of the spores, while a prolonged drouth restricts and kills them.

As a *Remedy* sulphurizing was long and strenuously recommended. In France and Germany mildew is successfully combatted with sulphur, early and often applied; why should it not be the remedy here? (!) Many articles were published in all our horticultural magazines representing flour of sulphur as an infallible cure of mildew, prescribing quantity, time, and mode of using it. Bellows were specially manufactured for this purpose. Wine-growers were found to testify to the efficacy of this panacea; none contradicted;† so that we ourselves, failing to see its good effect after repeated trials, merely ventured to say in the former edition of this Catalogue, that "with our prices of labor it would scarcely be practicable—and it is best not to plant largely of those varieties which are very liable to this disease."

Not until this mildew (Peronospora) had also been observed and studied in France, where it was first noticed in 1878, and only within these last four years, during which it has spread all over Europe and parts of Africa, has it been recognized and fully established that sulphurizing is quite ineffective against *Peronospora*, owing to the fact that this parasite, unlike the Oïdium, lives not merely on the surface of the leaf, but permeates its tissue.

Nevertheless we are not without hope that some remedy will be found. Eminent scientists will now occupy themselves with this serious question, which concerns European grape culture the more as their varieties (*Vinifera*) are all more subject to this disease than our Americans. We have now before us an "ESSAI SUR LE MILDIOU, PAR A. MILLARDET, Professeur à la Faculté des Sciences à Bordeaux," Paris, 1882; he suggests, as a remedy, a mixture of powdered sulphate of iron, copperas (4 lbs.), with plaster of Paris, gypsum (20 lbs.), which, according to reports, was applied (compte-rendu du congrès international phylloxerique de Bordeaux), with marked success. Remedies of this kind must be used very cautiously; and until their efficiency and proper mode of appliance are established, our grape-growers will do best to select those varieties which are generally less liable to this disease. To aid in doing so, the following table,* based on many years' experience, may be of service:

TABLE OF AMERICAN VINES (PRINCIPAL VARIETIES) WITH REGARD TO THEIR RESISTANCE TO MILDEW (*Peronospora*).

I. CATEGORY: almost entirely exempt, even in unfavorable seasons and localities.
- *Æstivalis*, Northern Division; Cynthiana, Norton's Virginia.
- *Labrusca*, Northern Division: Concord, Hartford, Ives, Perkins; also, Champion, Cottage, North Carolina, Rentz, Venango.
- *Riparia* and its crosses with Labr.: Elvira, Missouri Riesling, Montefiore, Noah, Taylor.

II. CATEGORY: suffering somewhat, *but not seriously*, in exceptionally unfavorable seasons and localities.
- *Æstivalis*, Southern Division: Cunningham; Northern Division: Hermann, Neosho.
- *Labrusca*, Northern Division: Dracut Amber, Lady, Martha, N. Muscadine, Telegraph, Mason's Seedling.
- *Riparia* and in its crosses with Labr,: Black Pearl, Blue Dyer (Franklin), Clinton.
- *Hybr.*, Labr. and Vinifera. Goethe.

III. CATEGORY: suffering seriously in unfavorable seasons, and *not recommendable for localities usually exposed to mildew.*
- *Æstivalis*, Southern Division; Devereux, Herbemont, Lenoir, Louisana, Rulander.
- *Æstivalis* crossed with Vinifera (?) Alvey.
- *Labrusca*, Southern Division: Catawba, Diana, Isabella.

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* To distinguish this from the *Oïdium* (the European mildew) we call the *Peronospora* "American mildew"; but this dangerous fungus is by no means unknown in Europe; and we doubt that it has come there from this country, though it showed itself here much sooner. In Italy and also in Africa it has appeared in many places where no American vine had ever been grown, and it has been discovered even on wild European vines. Rudolph Goethe, Director of the Royal Horticult. Inst. at Geisenheim, on the Rhine, calls it "*false mildew.*" Victor Pulliat, editor "Vigne Amer.", has shown that it was known in France, long ago, under the name of "*melin.*"

† The first honest testimony about the results of sulphurizing, in this country, we found in the "Vineland Weekly" of Nov. 24, 1877, in an excellent study of THE GRAPE ROT, by Col. A. W. Pearson, from which we clip the following:

"Many, if not all, of those here who have used sulphur this year for the first time are much disappointed in the result. They either report no benefit whatever, or else positive injury. Those who were more zealous than prudent, and used sulphur liberally undiluted, of course burned up their foliage, doing harm instead of good;—those, on the other hand, who used the preventive moderately, and, as they considered, thoroughly, will understand, if this description of the disease has enabled them to appreciate it, that "thoroughly," under the atmospheric conditions of this summer, would almost require that a sentry should be posted by each vine, ready to scatter another sprinkling of the mixture between showers.

"As already stated, I sulphured mine thirteen times, and saved about one-third of the crop. Possibly by going over them twenty-six times I might have saved another third."

* "Quelques Observations sur le Mildew, par *G. E. Meissner*," at the Congrès international de Bordeaux.

Riparia crosses with Labr.: Amber (Rommel's), Marion, Uhland.

Hybr., Labr. and Vinifera, Labr. and Hybr., and Vinif. with Rip.: Black Eagle, Brighton, Brandt, Herbert, Lindley, Triumph, Wilder.

IV. CATEGORY: suffering seriously even in normal seasons; *entirely unreliable*, except in some few favored localities, which are *free* from mildew.

Æstivalis, Elsinburg, Eumelan.

Labrusca, South. Division: Adirondac, Cassady, Creveling, Isabella, Iona, Mottled, Maxatawney, Union Village, Rebecca, Walter.

Undetermined Class: DELAWARE.

Hybr. of *Vinif.* and *Labr.*: Agawam, Allen's hybr. Amenia, Barry, Black Defiance, Croton, Irving, Massasoit, Merrimack, Salem, Senasqua.

Hybr. of Vinf. and Rip. Autuchon, Canada. Cornucopia, Othello.

Varieties not sufficiently tried, and especially new varieties, we would not presume to classify; but one may safely judge of their resistance to mildew by their parentage. The seedlings of the Concord, such as Moore's Early, Pocklington, Worden's Seedling; or of the Taylor and Clinton, such as Bacchus, Montefiore, Pearl, will most probably suffer very little, if at all, from mildew, while the seedlings of the Catawba, the Delaware, the Eumelan, or the Isabella, and all hybrids (of Vin.) give but faint hopes for their success in localities usually infested by mildew. It is further noteworthy that *all Grape-vines*, planted in city-gardens, especially if trained to buildings, under the shelter of their projecting roofs, are generally exempt from mildew, even in unfavorable seasons.

It is supposed that this immunity from the disease is due to the sulphuric coal-smoke-laden atmosphere in our cities, which may prevent fungoid growth, and to the shelter which protects the vines from heavy dews, consequently from the development of the parasite. Wm. Saunders, the eminent Superintendent of the Experimental Gardens of the United States Department of Agriculture at Washington, D. C., long ago demonstrated and reported that varieties inclined to mildew can be grown to perfection, when they are protected from heavy dews, either by artificial or natural expedients, such as those of covering the trellis upon which they are tied by a canopy of boards, canvas or glass. But grape growers will rarely resort to such expedients, and generally prefer to select varieties which are less subject to mildew.

The black ROT (*Phoma uvicola*) makes its appearance on the nearly full grown berries, exhibiting, in the first stage, a small discolored (whitish) round spot, which soon expands in circumference, surrounded by a distinct aureole of darker hue and shading off to a light brown; the surrounding berry turns darker brown, and exhibits (under a magnifier) a pustulous surface; then, gradually, the berry shrivels, dries up and turns black. In midsummer, when the weather is sultry and oppressive, thunder storms and rain showers frequent, the horizon at evenings illumed by continuous flashes of lightning, and when the vines are dew-drenched in the morning, then *rot* appears, and often disappears (or is rather interrupted in its progress) and re-appears with these phenomena. We may look and wonder, powerless, yet knowing

"That the bright hopes of to-day
May be dispelled by next morn!"

The disease is generally preceded by the appearance of numerous spots of brown color on the surface of the grape leaves; later these spots turn to a deeper brown, and finally holes appear in their places. In this respect it is quite similar to the disease known as *Anthracnose* or Charbon in France, as the *Schwarze Brenner* (black burner) in Germany, Switzerland, etc. But while, there, this disease attacks the young shoots and stems, leaving wounds as if eaten out by insects, causing the drying up of the epidermis, producing a deep slit on one side of the berry and leaving the other half of the same apparently healthy, fully coloring and ripening; the brown spots *preceding our Rot* rarely attack the shoots or stems of our grape-vines, and the *black Rot* of this country never produces mere slits, but always completely destroys those berries which are once touched by it. While the Anthracnose weakens the vine and causes the foliage to turn yellow and dry up, the black Rot seems not to affect the vigor of the vine nor its foliage in the least. Of late, however, it attacks not rarely from one to three-fourths of *all* the grapes in the vineyards of the Ohio, Mississippi and lower Missouri valleys, and is there the great obstacle to successful grape-culture. Thirty years ago it was supposed that the *Catawba*, more than any other grape, was subject to rot, but now nearly ALL varieties (except Delaware, Cynthiana, Nortons) are often more or less attacked by this baneful parasite. It infests the most vigorous vines as much, if not more than weak growers. The Concord has of late proved as unresisting to the black Rot as the Catawba. The theory that a plant can be attacked by fungoid diseases only when in a debilitated condition, does not hold good as to Rot; nor has the exhaustion of the soil any influence upon this scourge. Rot is found as much in vineyards planted on rich soil as in those growing on poor land. The theory that Rot is induced by Phylloxera (root lice) is entirely unfounded.

Atmospheric electricity, humidity and dryness, may materially influence the spreading or stopping of the disease. The nature of the soil and the exposure of the vineyard may have something to do with the appearance of this malady, which especially rages on low, damp places, with a cold, compact soil; but *rot* sometimes also commenced during very dry weather, and stopped, strangely enough, after the first rains of the same season, and it was also sometimes found in elevated positions, with a warm, dry soil. As a rule, however, dry seasons and localities, blessed with a purer atmosphere and superior drainage, are more exempt from rot.

The late M. B. BATEHAM (died August 5, 1880), wrote in his *last* report to the Ohio Hort. Society, referring to an essay read at the Am. Pomol. Society meeting, 1879, as follows: "As to Grape Rot, my observations of more than twenty years have led me to the same conclusions, in the main, as those of my friend, Mr. Bush. The difficulty is certainly not in soil or cultivation, or in the vine, or in the effect of

insect ravages. * * * This disease commenced in Southern Ohio more than twenty years ago,* and in a short time ruined the noted Catawba vineyards of Nicholas Longworth and those of a score of other planters. Then, for a time, it was thought that the Ives grape, and especially the Concord, would prove exempt from the destroyer; hence these were extensively planted. But now scarcely any variety is found able to resist attacks of the rot, or if any chance to do so, like the Delaware, they suffer badly from mildew. Many different theories have been held respecting the nature and causes of rot, each pointing to different measures for its prevention, but with little benefit as to results. Not deeming other theories worthy of space, I will say that, after twenty years of careful observation and experiments, the following facts and deductions are the result: 1. The disease is not peculiar to any variety or class of vines, though some are more liable to it than others, and such as have been some years in bearing are more liable than younger ones. 2. The kinds of soil and culture have no effect in causing the rot; but a rich soil, or too much fertilizing, by producing luxuriant growth of the vines, increases their liability to the disease, and wet soil or lack of drainage has a similar effect. 3. Methods of pruning and training, whether long or short, do not cause the rot; but it is mostly prevented by training against buildings where the vine is largely sheltered from rain and dew. 4. The disease is of a fungus nature, generating from minute spores which float in the atmosphere, where they are quickened into life and growth by heat and moisture, combined with a plethora of sap, which is at the time in a morbid condition, owing to the stoppage of evaporation and assimilation by the leaves. * * * * * Such being the nature and causes of the disease, it is easy to see that the means of its prevention are not largely within human control. It is found, however, that something can be done in the way of avoiding the malady."

Bateham's suggestions to avoid the rot, however, are partly not very practicable, except on a very small scale, such as training vines against buildings, on poles twenty feet high; and partly, they need further experiments before they can be recommended as remedies. To plant vineyards on as high and open a position as possible, with perfect drainage; to allow plenty of room on the trellis by planting the vines apart, or cutting out every alternate one when they begin to crowd, are, of course, necessary, in order to keep the soil and roots as dry as possible in summer, and to secure the free access of sun and air, so as to diminish, at least, if not to prevent the disease.

Mulching the soil, preventing an excess of heat, is recommended by some, to lessen the liability to rot. Mulching the ground beneath the vines with bituminous coal-slack is said to have been tried with much advantage. We have tried other materials as mulch with no particular results. Some recommend sulphuring, others a board nailed over the trellis, as protectons from rot; but both are of no avail against this cryptogam. SAUNDERS himself said that he had recommended a coping as a protection against mildew only—not against rot.

* Should read, "more than *thirty* years ago." Evidently a typographical error, as Bateham certainly knew that Longworth wrote about it in 1848.

We are still hoping that some more practical mode to prevent rot, or to hinder the development of the disease, may be discovered; but until that is found we should plant only varieties which are less subject to rot, unless we are fortunate enough to be in localities which are exempt from the disease. Vineyards which are yet free from rot this year, may become infested the next. Who can tell?

We trust, however, that this disease, like other epidemics, may cease, or at least temporarily disappear, as it has already done in some localities. There are, no doubt, several kinds of grape-rot, variously designated by botanists. For the practical grape grower, the *one* kind here described is the only one of great, sad importance, whether they call it black rot or brown rot.

[Those who desire to read more exhaustive descriptions and observations on this subject, we refer to Dr. E. C. Bidwell's and Col. Pearson's articles in the Vineland Weekly, and lately, also, in the New York Sun, copied by various horticultural journals, and deserving to be published in pamphlet form. But after studying them all, we arrive at the conclusion that we know very little, practically, to our advantage about the subject.]

For those who desire to grow fine grapes, on a small scale, for table use, for the market, or for exhibition,

THE BAG METHOD OF PROTECTING GRAPES

should be mentioned. Common manilla paper bags, as used by grocers, about six inches wide and nine inches deep, are put over the bunches before they are half grown, and are fastened by two pins. They should also have a small slit in the bottom, to let water run through it. The cost of bags, pins and labor is about half a cent per bag, and is well repaid by the result. Others found a better protection from insects, birds and diseases, in covering each bunch of grapes with a bag made of cheap crossbar mosquito netting. This kind of bag is slipped over the bunch and tied around the stem with a string; it interferes less with the natural coloring and perfect ripening of the fruit. In France a specially prepared net bag is made for this purpose, which is stronger than mosquito net, keeps its shape better, and is far more durable—sufficiently open to admit air and partial sunlight, affording perfect protection against birds, and with all other advantages, which paper bags could have, without their objections. We used the latter and found them excellent, but not a perfect protection against rot.

INSECTS.

[Our limited space only permits us to briefly refer to a few of those insects which we have found most injurious in our own vineyards. These are, however, for the most part unnoticed in any of our standard treatises on the Grape-vine, and for the facts regarding them we are indebted to Prof. C. V. Riley's valuable "Entomological Reports of the State of Missouri.]"

The Grape Phylloxera.

(*Phylloxera vastatrix.*)

Among the insects injurious to the Grape-vine none have ever attracted as much attention as the Phylloxera, which, in its essential characteristics, was unknown when the first edition of this little work on American Grape-vines was written. The gall-inhabiting type of this insect, it is true, was noticed by our grape-growers many years ago (especially on the Clinton), but they knew nothing of its root-inhabiting type. Even Fuller—who informs us that in Mr. Grant's celebrated grape nurseries (as far back as 1858) the men were in the habit of combing out, with their fingers, the roots of young vines to be sent off, in order to get rid of the knots—never mentions anything of this, nor of any root-infesting insect, in his excellent Treatise on the Cultivation of the Native Grape, though 16 pages are devoted to its Insects. In the spring of 1869 M. J. Lichtenstein, of Montpellier, first hazarded the opinion that the Phylloxera, which was attracting so much attention in Europe, was identical with the American Leaf-gall Louse (first described by Dr. Asa Fitch, State Entomologist of New York, by the name of *Pemphigus vitifoliæ*); and in 1870 Prof. C. V. Riley succeeded in establishing the identity of their gall insect with ours, and also the identity of the gall and root-inhabiting types. The correctness of his views is confirmed by the subsequent researches of Professor Planchon, Dr. Signoret, Balbiani, Cornu, and other scientists in France; lately also of Prof. Roessler, in Klosterneuburg in Austria.

After visiting France in 1871, and then extending his observations here, some of which were made in our Bushberg vineyards, Prof. Riley first gave us every reason to believe "that the failure of the European vine (*V. vinifera*) when planted here, and the partial failure of many hybrids with the European *Vinifera* are mainly owing to the injurious work of this insidious little root-louse; also, that some of our native varieties enjoy relative immunity from the insect's attacks"—M. Laliman, of Bordeaux, having previously noticed the remarkable resistance of certain American vines in the midst of European vines dying from the effects of Phylloxera. The importance of these discoveries to grape culture cannot be too highly appreciated. The French Minister of Agriculture commissioned Professor Planchon to visit this country in order to study the insect here—the harm it does to our vines, or the power of resistance which these possess. His investigations not only corroborated Prof. Riley's conclusions regarding the Phylloxera, but gave him, and through him the people of Europe, a knowledge of the quality of our native grapes and wines, which dispels much of the prejudice against them that has so universally prevailed heretofore.

Prof. Riley's recommendations to use certain American vines, which he found to resist Phylloxera, as stocks on which to grow the more susceptible European vine, has induced us to send a few thousand plants and cuttings, gratis, for testing, to Montpellier, France, and the success of these has resulted in an immense demand for the resistant varieties.

To discuss this subject as it deserves; to give a history of the Grape Phylloxera—the progress and extent of its ravages—the experiments made to prevent these; to review the influence which it had and probably will have on American grape culture, would far exceed the scope of this brief manual. The literature of this subject would fill a respectable library. We can here merely mention a few facts, and give some figures, which may enable the grape-grower to recognize and observe this minute, yet so important insect; and we refer those who desire full and reliable information to Prof. Riley's Entomological Reports, from which we cull largely. It will be understood that the figures, which are from the same Reports and which were made by Prof. Riley from nature, are generally very highly magnified, and that the natural sizes are indicated by dots within circles, or by lines.

The following figure of a grape-leaf shows the galls or excrescences produced by the gall-inhabiting type of the insect. On carefully opening one of the galls, we find the mother louse diligently at work surrounding herself with pale yellow eggs, scarcely (.01) the one-hundredth part of an inch long, and not quite half as

Under side of Leaf covered with Galls, nat. size.

thick. She is about .04 inch long, of a dull orange color, and does not look unlike an immature seed of the common purslane. The eggs begin to hatch, when 6 or 8 days old, into active little beings, which differ from their mother in their brighter yellow color, more perfect legs, etc. Issuing from the mouth of the gall, these young lice scatter over the vine, most of them finding their way to the tender terminal leaves, and commence pumping up and appropriating the sap, forming galls and depositing eggs as their immediate parent had done before. This process continues during the summer, until the fifth or sixth generation. Every egg brings forth a fertile female, which soon becomes wonderfully prolific.

Type Gallicola: *c*, egg; *d*, section of gall, enlarged; *e*, swelling of tendril, nat. size.

By the end of September the galls are mostly deserted and those which are left appear as if infected with mildew, and eventually turn brown and decay. The young lice attach themselves to the roots, and thus hibernate. It is an important fact that the gall-inhabiting insect occurs only as an agamic and apterous female form. It is but a transient summer state, not at all essential to the perpetuation of the species, and does, compared with the other or root-inhabiting type, but trifling damage. It flourishes mostly on the *Riparia*, more especially on the Clinton and Taylor; its galls have also been noticed on many other varieties. In some seasons it is even difficult to find a few galls on the very vines on which they were very abundant the year before.

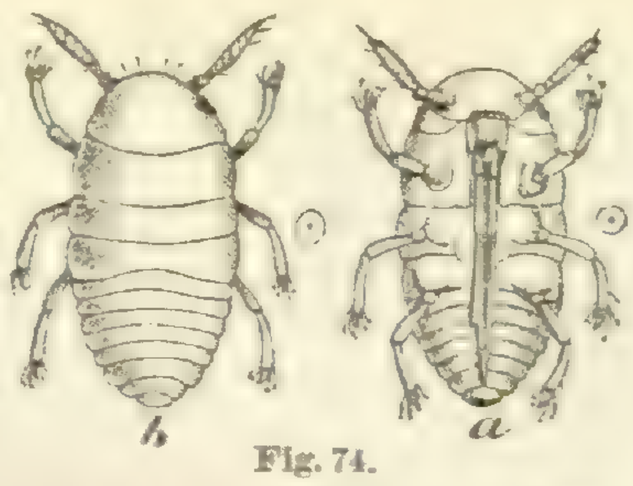


Fig. 74.
NEWLY HATCHED GALL-LOUSE: *a*, ventral; *b*, dorsal view.

Fig. 75. MOTHER GALL-LOUSE: ventral and dorsal views.

The root-inhabiting type of the Grape Phylloxera hibernates mostly as a young larva, attached to the roots, and so deepened in color generally as to be of a dull brassy brown, and therefore perceived with difficulty, as the roots are often of the same color. With the renewal of vine-growth in the spring, this larva moults, rapidly increases in size, and soon commences laying eggs. These eggs, in due time, give birth to young, which soon become virginal, egg-laying mothers like the first, and, like them, always remain wingless. Five or six generations of these egg-bearing mothers follow each other, when, about the middle of July, in the latitude of St. Louis, some of the individuals begin to acquire wings, and continue to issue from the ground until vine-growth ceases in the fall. Having issued from the ground while in the pupa state, they rise in the air and spread to new vineyards, where they lay from three to five eggs, and then perish. In the course of a fortnight these eggs, which are deposited in the crevices on the surface of the ground, near the base of the vine, and upon the leaves, especially on the under side, produce the sexual individuals, which are born for no other purpose than the reproduction of their kind, and are without means of flight or of taking food. They are, however, quite active and couple readily.

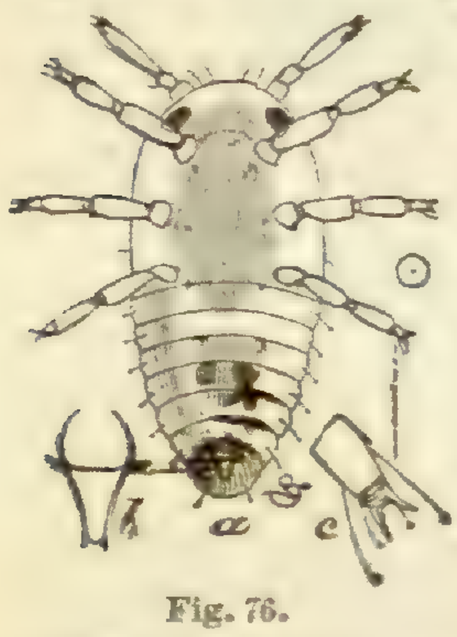


Fig. 76.
MALE PHYLLOXERA: ventral view.

The female lays a single egg, which has been called the "winter egg," from the fact that it generally passes the winter unhatched. It may, however, hatch the same season that it is laid. It is generally hidden in the crevices and under the loose bark of the older wood, but may also be laid in other situations, and even on old leaves on the ground. There hatches from it the "stem-mother," which either goes directly on to the roots to found a root-feeding colony, or, under favorable circumstances, founds a gall-inhabiting colony on the leaf.

Every piece of root having rootlets taken from an infected vine during August or September will present a goodly proportion of pupæ, and a glass jar filled with such roots and tightly closed will daily furnish, for some time, a dozen or more winged females, which gather on the side of the jar toward the light. We may gather some idea from this fact, of the immense number that disperse through the air to new fields from a single acre of infected vines, in the course of the late summer and fall months. We have, therefore, the spectacle of an underground insect possessing the power of continued existence even when confined to its subterranean retreats. It spreads in the wingless state from vine to vine and from vineyard to vineyard, when these are adjacent, either through passages in the ground itself, or over the surface; at the same time it is able, in the winged condition, to migrate to much more distant points.

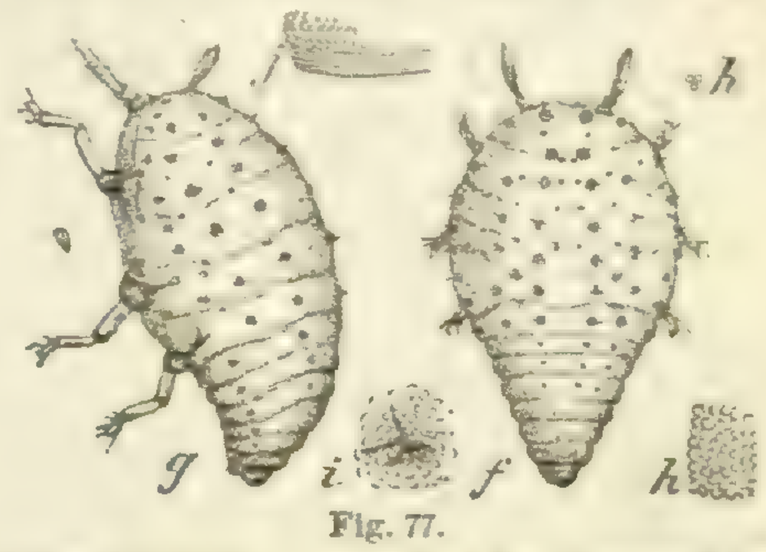


Fig. 77.
TYPE RADICOLA: showing the tubercles by which it is distinguished from *Gallicola*.

If to the above account we add that occasionally individuals, under certain conditions, abandon their normal underground habit, and form galls upon the leaves of certain varieties of grape-vines, we have in a general way the natural history of the species.

The annexed figure (78) shows the abnormal swelling of the rootlets which follows the puncture of the root-louse; they eventually rot, and the lice forsake them and betake themselves to fresh ones. As these decompose, the lice congregate on the larger parts beyond, until at last the root-system literally wastes away.

During the first year of attack there are scarcely any outward manifestations of disease; only the second and third year—when the fibrous roots have vanished, and the lice not only prevent the formation of new ones, but settle on the larger roots, which also eventually become disorganized and rot—do the outward symptoms of the disease become manifest in a sickly, yellowish appearance of the leaf, and a reduced growth of cane; and the vine dies. When the vine is about dying, it is generally impossible to discover the cause of the death, the lice having previously left for fresh pasturage.

As is frequently the case with injurious insects, the Phylloxera shows a preference for and thrives best on certain species, and even discriminates between varieties, or what amounts to the same thing, practically, some species, or varieties, resist its attacks, and enjoy relative immunity from its injuries. A knowledge of the relative susceptibility of different varieties to the attacks and injuries of the insect is therefore of paramount importance.

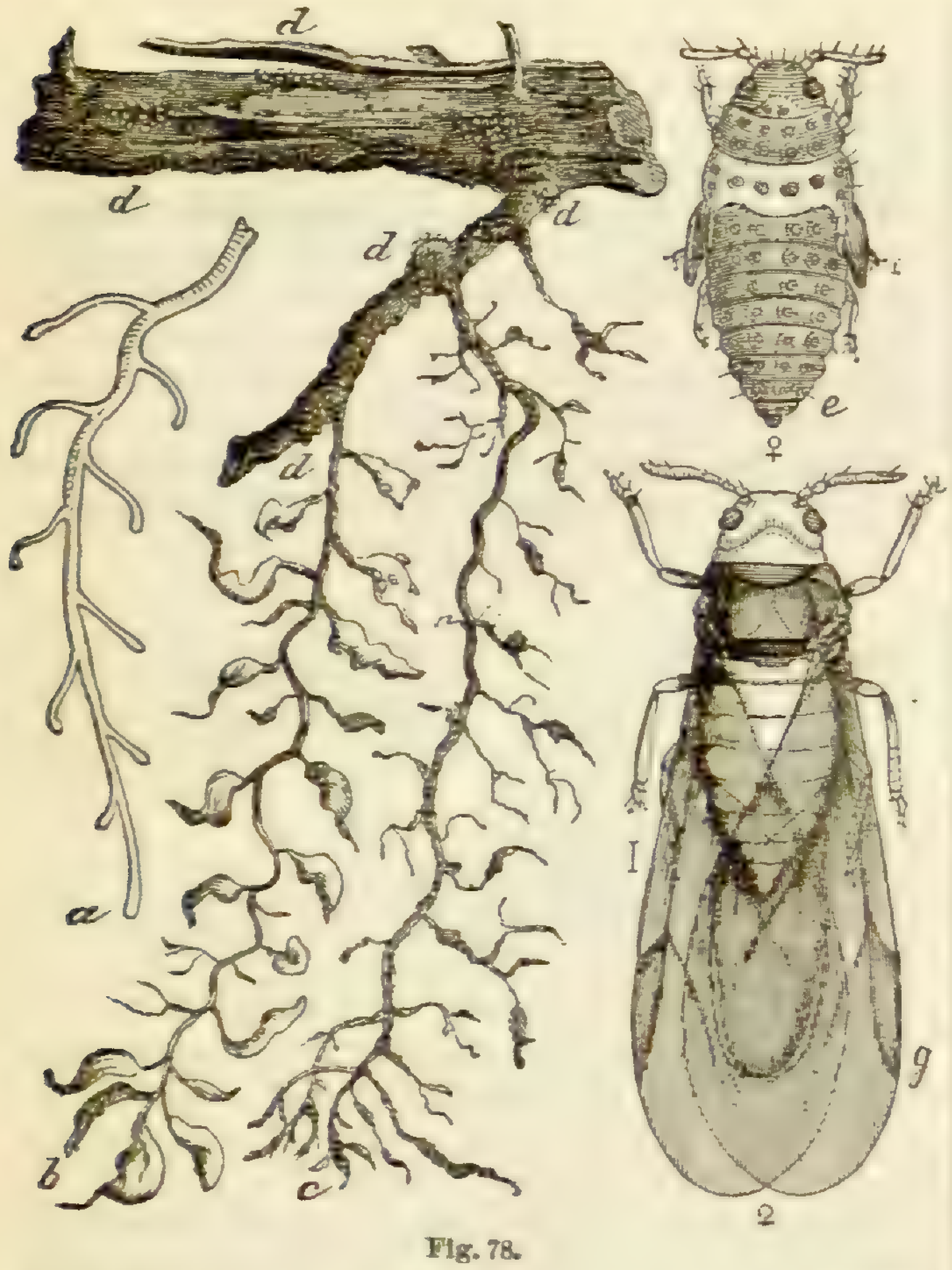


Fig. 78.

TYPE RADICICOLA: *a*, shows a healthy root; *b*, one on which the lice are working, representing the knots and swellings caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, show how the lice are found on the larger roots; *e*, female pupa, dorsal view; *g*, winged female, dorsal view.

The editors of this Catalogue could not help, however, to doubt the theory of a relative susceptibility, or a greater or less power of resistance, in various varieties of our American vines. The Catawba, the Delaware, were among those considered most sensitive to the attacks of the insect. But their very existence after so many years of their cultivation in the home of the Phylloxera, and their vigorous and healthy growth in some Phylloxera-infested localities in France, contradict this assumption. And now most of those who gave special attention to this question, and have had the opportunity to test it both here and in Europe, are firmly of the opinion that *all purely American varieties* completely resist the Phylloxera, and can succeed in spite of the insect, provided they are placed in locations suitable as to soil and climate.

We see in the general resistibility of our purely native American vines against the Phylloxera, a remarkable verification of that law which Darwin has so ably established and aphoristically expressed, as "THE SURVIVAL OF THE FITTEST."

Prof. Riley, in explaining "why the insect is more injurious in Europe than here," says: "There exists a certain harmony between the indigenous fauna and flora of a country; and our native vines are such as, from their inherent peculiarities, have best withstood the attacks of the insect. The European vine, on the contrary, succumbs more readily, not only because of its more tender and delicate nature, but because it has not been accustomed to the disease—there being, doubtless, a parallel between this case and the well-known fact that diseases and parasites which are comparatively harmless among peoples long accustomed to them, become virulent and often fatal when first introduced among hitherto uncontaminated peoples. Then the particular natural enemies of the insect which belong to its own class, and which in this country help to keep it within bounds, are lacking in Europe; and it will require some time before the closely allied European predaceous species will prey upon and check it there to the same extent. The Phylloxera will, also, all other things being equal, have an advantage in those countries where the mildness and shortness of the winter allow an increase in the annual number of its generations. Finally, the differences in soil and in modes of culture have no insignificant bearing on the question in hand. Though Phylloxera, in both types, is found on our wild vines, it is very doubtful if such wild vines in a state of nature are ever killed by it. With their far-reaching arms embracing shrub and tree, their climbing habit unchecked by the pruner's knife, these vines have a corresponding length and depth of root, which render them less susceptible to injury from an under-ground enemy. Our own method of growing them on trellis approaches more nearly these natural conditions than that employed in the ravaged French districts, where the vines are grown in greater proximity and allowed to trail upon the ground, or are supported to a single stake."

Again, after speaking of the large numbers of winged females rising from the ground during late summer and fall, he adds: "The winged female Phylloxera is wafted about, and will lay her eggs, or, in other words, deliver herself of her progeny, wherever she happens to settle. If this be upon the grape-vine, well and good—the young live and propagate; if upon other plants, they perish. We thus have the spectacle of a species annually wasting itself away to a greater or less extent, just as in the vegetable kingdom most species produce a superabundance of seed, the larger portion of which is destined to perish. Thus in the thickly planted wine districts of France few winged insects would fail to settle where their issue could survive, while in America an immense number annually perish in the large tracts of other vegetation intervening between our vineyards."

Under the stimulus of a large reward (300,000 francs) appropriated for the purpose by the French Government, innumerable plans have been proposed and experiments made, but *no remedy* has yet been discovered which gives entire satisfaction, or is applicable to all conditions of soil.* Submersion is an efficacious remedy, but to be effective the field must be covered with water one foot deep during eight weeks, November and December being considered the proper period; a less complete submersion is useless, and on most and especially on the best hilly vinelands such submersion is impracticable. A large admixture of sand in the soil is also of service, as the root-louse does not thrive on sandy soils. This was first discovered by

* ***La lutte contre le phylloxera.*** (The struggle against the Phylloxera) by J. A. Barral, 1 vol., Paris, 1883, is the latest and most complete work on this subject.

LICHTENSTEIN; and as a result of this discovery the sandy borders of the Mediterranean coast (Aigues-mortes), where formerly scarcely poor grass grew, are now, in many places, changed into beautiful vineyards, of great value. Sulpho-carbonate of potassa and coal-tar are mentioned as capable of destroying the Phylloxera, and Mr. Marés as President of the Ministerial Commission, in his report on the various (140) modes of trea tment tried in 1872 to 1874, stated that manures rich in potash and nitrogen, mixed with alkaline or earthy sulphates, refuse of salt-works, soot, wood ashes, ammonia, or fat-lime, have given the best result. Prof. Roessler also believed in fighting the insect with manure and phosphates, ammonia and potash, which treatment succeeds in porous soils; and to obtain this porosity he made use of dynamite, raising the soil from a great depth without injuring the vines. But the grape-growers seem not to believe in these medicinal insecticides, or considered them impractical, too costly, and their application too laborious. Many preferred to resort to planting American vines, mostly with a view to graft thereon their own varieties. And now the American vine has penetrated into all the vineyards of France—notwithstanding its many opponents, both honestly and otherwise; nothwithstanding the ill-favor of the Government, where subventions had been reserved for the insecticides and the submersion. And this result is not a passing one, but has gained a stronghold by the exceptional and growing vigor of the American vines themselves, under various conditions of soil and in the midst of the most intense ravages of the Phylloxera. The Medoc even opens now its doors to the most meritorious grafting stocks, the *Riparia*, Solonis, York Madeira, being now convinced that their celebrated Medoc wines will not be in the least changed by grafting their varieties on American roots. It is the same in other famous wine districts, and even in the regions of the great white wines (Sauterne, Bommes, Barsac, &c.) which are as yet but little attacked by the Phylloxera. It will be the same in other countries, wherever the insect shall make its appearance, in spite of all precautionary measures to protect them from infection. Already it has been discovered in *Italy* (first in 1879 in the Lombardy and Porto Mauritzio, then in Sicily), and is spreading rapidly over all the Mediterranean countries, and over Hungary.

Riley and Planchon have established the fact that the insect is indigenous to the North American continent east of the Rocky mountains, and there is little doubt but that it was first imported into Europe on American vines. Yet it must not be supposed that our American vines are all necessarily infested with Phylloxera, or that the insect has been introduced in every locality where our vines have been planted. On the contrary, there are localities where, from the isolated position of the vineyards, or the nature of the soil, it is difficult to find the insect, and, like many other indigenous species, it is in some years very numerous and injurious, in others, scarcely to be seen. There is comparatively little danger of its being imported from one country to another on *cuttings*. It should be recollected also that vines imported in late winter, or early spring, cannot possibly carry the insect, even if infected, in any other than the egg or larva form, as no winged insects are then in existence, to escape on the way, or upon opening the cases; and all danger of importing the insect would be avoided if the plants or cuttings, upon being unpacked, were placed in a bath of strong soapsuds.

Prof. V. MAYET, of the National Agricultural School at Montpellier, advises the following precaution:—(Vignes Am., Dec., 1882.) "1. Never to keep the cuttings in the soil, in whatever else we may preserve them for exportation; clear fine sand would be preferable. 2. To fumigate the cuttings on arrival with sulphur smoke, as the sulphuric acid infallibly kills all insects, without injuring the buds or vegetation; ten minutes are fully sufficient for that. An old large box may serve as a receptacle for the fumigation." In answer to inquiries whether this would be sufficient also to destroy the eggs of the Phylloxera, the Professor emphatically declares (Vignes Am., May, 1883), that "we need not trouble ourselves about the eggs—none of these have ever been found on canes of one year's wood. And if ever any live insects were transported with cuttings, less than a quarter of an hour's fumigation with sulphur would kill them on arrival."

The greatness of the evil, however, seemed to justify the adoption of extreme measures, and the importation of both American vines *and cuttings* was strictly prohibited by the governments of Europe (except as to certain already invaded districts of France). Thus they excluded—not the insect, but the best remedy. And whilst it is now recognized and fully established that Phylloxera-destroyed vineyards can be reconstituted only by replanting with resisting American vines, be it for direct production or for grafting on them other preferred varieties, it is yet very difficult to get the prohibitions and restrictions repealed. V. Babo, the celebrated Director of the Oenol. Institute of Austria, Klosternenburg, near Vienna, writes us (April, 1883) that "notwithstanding the unanimous declaration of the Commission in favor of American Grape-vines, the Government refuses to listen; we shall tarry until the Louse will have spread as a great calamity. Sulpho-carbonates are contiually used—at Government's expense. The moment it shall have to be done at private expense nobody will use it, as the annual cost is out of proportion to the effect. In spite of my own most careful and thorough treatment with sulpho-carbonates my success is incomplete. Much as I was at first in favor of sulpho-carbonates, I am now fully convinced that our grape-culture cannot be carried on except by using proper Phylloxera-resisting stocks."

The *Revue des Deux Mondes* of June 1, 1883, contains a very interesting article on the Phylloxera question by the Duchess of Fitz-James, in which she says:—"While the Philloxera continues to extend her sinister veil over beautiful France, the American Vine throws over it here and there a ray of hope. Happy the soil which, in receiving it, lays hold of its good fortune. It is this ray before which the desert will vanish. Those who are unconscious of it, try in vain to defend a past which has escaped; for the chemical remedies, even if they were useful, are only exceptionally practical; and while thus many persevere in their ruin, pursuing a chimera, the American Vine covers with her verdant waves the last trace of our misfortunes."

Fig. 79.

The Grape Leaf-hopper.

(*Erythroneura vitis.*)

Very generally but erroneously called *Thrips*. This is one of the most troublesome insects the grape-grower has to deal with. It is a very active little thing, running sideways like a crab, and dodging round quickly to the other side when approached. It jumps with great vigor, and congregates in great crowds upon the under side of the leaf, pumping up the sap, and thus causing numerous brown dead spots, and often killing the leaf entirely. A vine badly infested with these leaf-hoppers wears a speckled, rusty and sickly appearance, while the leaves often drop prematurely and the fruit in consequence fails to ripen. There are several species which attack the vine—all belonging to the same genus, however, and only differing in color. The natural history of this insect is not recorded by entomologists, but Prof. Riley informs us that the eggs are thrust into the leaf-stems, and particularly along the larger veins of the under side of the leaves. Tobacco-water and soapsuds, to be syringed on the vines, are recommended in the books as a remedy. Syringing the vines with the following mixture—one gill kerosene, two pounds whale-oil soap, one pound tobacco soap, and eighty gallons water—is said to destroy the green fly and thrip, and to be also a good remedy against the red spider and the mealy bug. Fumigations of tobacco stems will also be found effectual for destroying aphis and thrip. But we would recommend passing between the rows with a torch in the evening, smearing the stakes in the spring with soft soap or other sticky substance, and burning the leaves in the fall. The hoppers fly to the light of the torch; and as they pass the winter under leaves, loose bark of the stakes, &c., cleanliness in and about the vineyard is of the first importance in checking their ravages. The torch remedy is most effectual when three persons work in company, one between two rows with the torch, and one on the further side of each of the rows to give the trellis a slight shake and disturb the hoppers. Tobacco stalks or waste thrown on the ground in a grapery effectually protect the vines.

The Grape Leaf-folder.

(*Desmia maculatis.*)

This is a worm of grass-green color, very active; wriggling, jumping and jerking either way at every touch. It folds rather than rolls the leaf, by fastening two portions together by its silken threads. The chrysalis is formed within the fold of the leaf. The moth is conspicuously marked with black and white, all the wings being bordered and spotted as in the annexed figures. The male is distinguished from the female by his elbowed antennæ, thickened near the middle, while those of the female are simple and thread-like. The moths appear in early spring, but the worms are not numerous till mid-summer. A good method to destroy the worm is by crushing them suddenly with both hands, within the leaf. The last brood hybernates in the chrysalis state within the fallen leaves, and much may be done towards checking the ravages of this worm, which during some years are very severe, by raking up and burning the dead leaves in the fall.

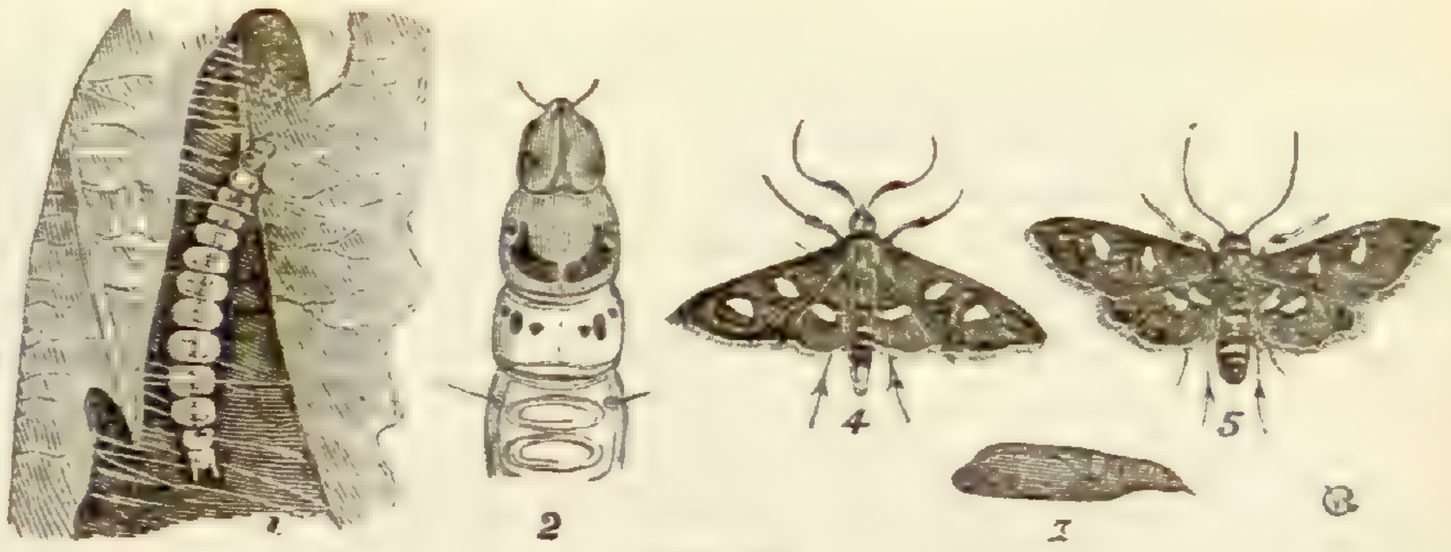


Fig. 80.

Grape Leaf-folder: 1, larva; 2, head and thoracic joints, enlarged; 3, chrysalis; 4, 5, male and female moths.

The Grape-vine Fidia.

(*Fidia viticida.*)

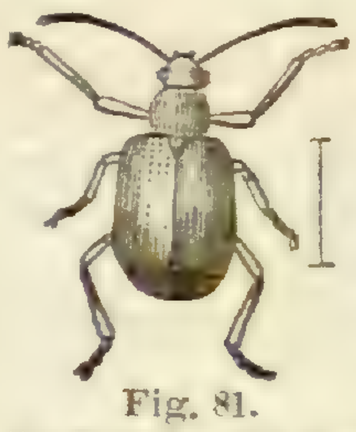


Fig. 81.

This beetle, often miscalled the Rose-bug, is one of the worst foes of the grape-vine in Missouri. It makes its appearance during the month of June, and by the end of July has generally disappeared. When numerous, it so riddles the leaves as to reduce them to mere shreds. Luckily this beetle drops to the ground upon the slightest disturbance, and thus enables us to keep it in check, by taking a large basin with a little water in it, and holding it under the insect. At the least jar the bugs will fall into the dish. When a quantity have thus been caught, throw them into the fire or pour hot water upon them. M. Poeschel of Hermann, raised a large brood of chickens, and had them so well trained that all he had to do was to start them in the vineyard, with a boy in front to shake the infested vines, and he himself behind the chicks. They picked up every beetle that fell to the ground; and next season he could scarcely find a single Fidia.

The Gigantic Root-borer.

(*Prionus laticollis.*)

Fig. 82.

This large borer is often met with in and about the roots of several kinds of plants, such as the Apple, the Pear, and the Grape, to which it is very destructive. It follows the roots, entirely severing them in many

instances, so that the vines soon die. When fully grown it leaves the roots it was inhabiting, and forms a smooth, oval chamber in the earth, wherein it assumes the pupa form. If the roots are larger, it remains within them to undergo its changes. The perfect insect is a large, dark brown beetle, which first appears towards the end of June, and is very commonly found during the summer and fall months, rushing (often with a heavy, noisy flight) into lighted rooms. Prof. Riley has shown that this borer not only attacks living trees and vines, but that it also breeds in dead oak stumps, and can travel through the ground from one place to another; from which fact he draws the important corollary that it will not do to leave oak stumps to rot on ground which is intended for a vineyard—a fact which our experience corroborates. Little can be done in the way of extirpating these underground borers, their presence being only indicated by the death of the vine. Wherever you find vines suddenly dying from any unknown cause, search for this borer, and upon finding one (in each case we have found but *one* at each tree or vine), put an end to its existence.

The Grape-vine Flea-beetle.

(*Haltica chalybea.*)

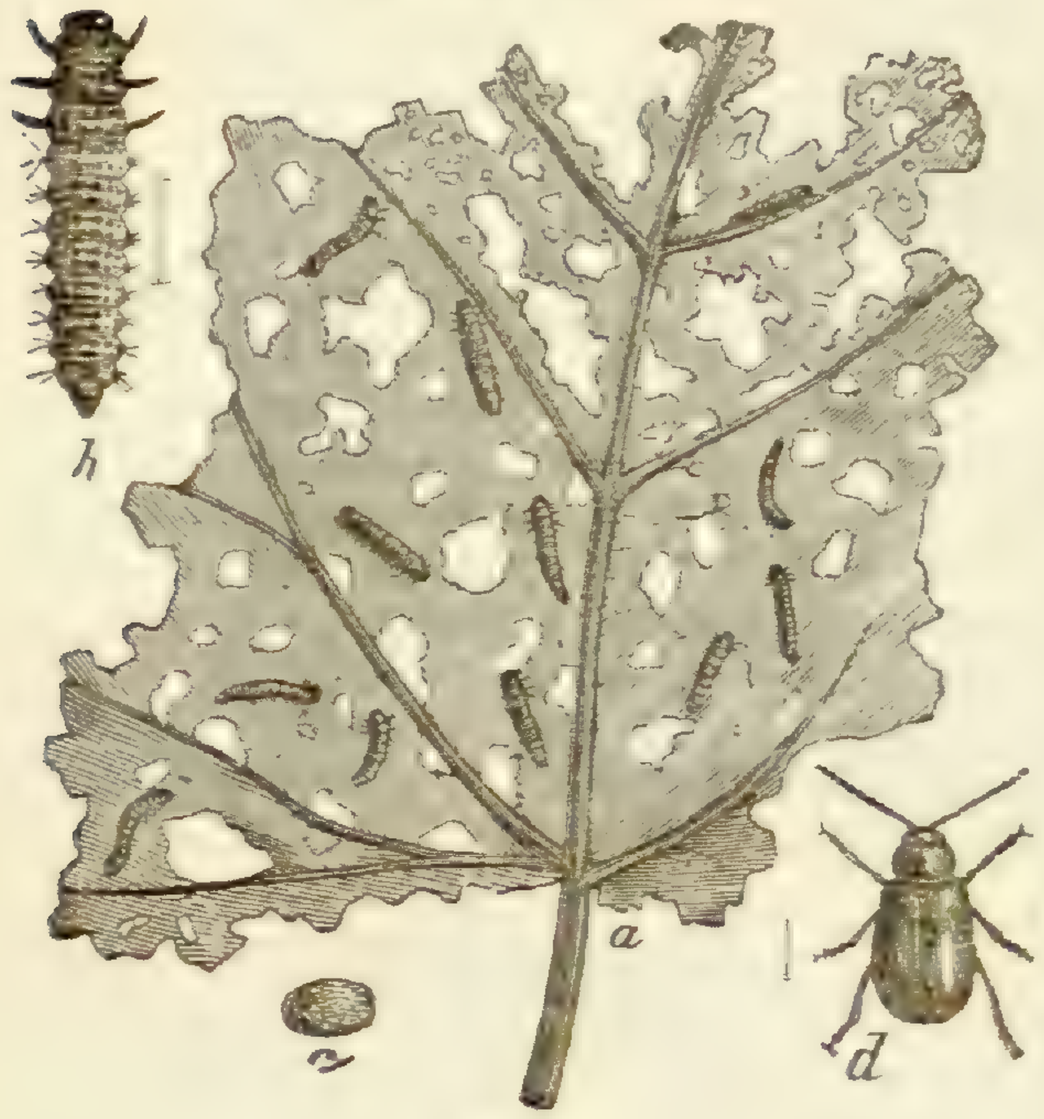


Fig. 83.

a, larva, natural size; *b*, do. magnified; *c*, cocoon; *d*, beetle, enlarged.

Like all Flea-beetles, this insect has very stout swollen high thighs, by means of which it is enabled to jump about very energetically, and is consequently very difficult to capture. The color of the beetle varies from steel-blue to metalic green and purple. The beetles hibernate in a torpid state under any shelter, such as loose bark, crevices of stakes, etc., and they are roused to activite quite early in the spring, doing the greatest damage at this early season by boring into and scooping out the unopened buds. As the leaves expand, they feed on these, and soon pair and deposit their small orange eggs in clusters on the under-side of the leaf. These eggs soon hatch into dark colored larvæ, which may be found of all sizes during the latter part of May and early part of June, generally on the upper-side of the leaf, which they riddle, devouring all but the largest ribs. A dusting of dry lime kills the larvæ, but the beetle has to be caught and killed.

The Grape-berry Moth.

(*Lobesia botrana.*)

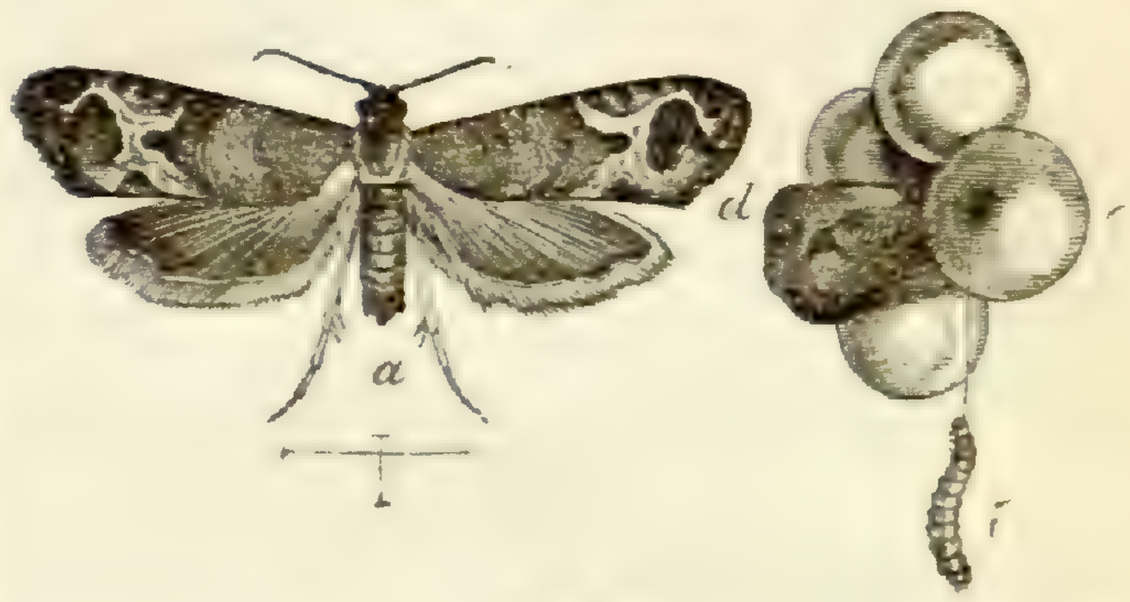


Fig. 84.

a, moth; *b*, worm; *c*, hole made in berry; *d*, rotting berry, caused by worm.

This insect first attracted attention about fifteen years ago. About the first of July, the grapes that are attacked by the worm begin to show a discolored spot at the point where the worm entered. Upon opening such a grape, the inmate will be found at the end of a winding channel. It continues to feed on the pulp of the fruit, and upon reaching the seeds generally eats out their interior. As soon as the grape is touched the worm will wriggle out of it, and rapidly let itself to the ground by means of its ever-ready silken thread, unless care be taken to prevent it from so doing. The cocoon is often formed on the leaves of the vine, in a manner essentially characteristic: the worm cuts out a clean oval flap, leaving it hinged on one side, and, rolling the flap over, fastens it to the leaf, and thus forms for itself a cozy little house, in which it changes to a chrysalis. In about ten days after this last change takes place, the chrysalis works itself out of the cocoon and the little moth represented in the figure (hair-lines showing natural size) makes its escape. As a remedy we recommend picking up all fallen berries and converting them into vinegar, as, upon racking off the juice and water, countless numbers of these worms are found in the sediment. This insect was named *Penthnia vitivorana*, by Dr. Packard, in this country; but Prof. Riley informs us that it is an importation from Europe, where it is known as *Lobesia botrana*.

The Rose-chafer.

(*Macrodactylus subspinosus.*)

Fig. 84.

This is the true "Rose-bug," injurious to many plants, but especially hard on grape-vines during some years. In Prof. Riley's words: "It is one of those species whose larva develops under ground, and cannot be very well dealt with in this stage of its life. We must contend with it in the beetle form, and there is no other effectual means than by hand-picking, or by shaking into vessels and on to sheets. This work can be greatly facilitated by taking advantage of the insect's tastes and preferences. It shows a great predilection for the Clinton, and its close allies, of all other

varieties of the grape-vine, and will gather upon that variety and leave others unmolested, where it has a chance. Those who are troubled with this beetle will no doubt take the hint."

The Grape-curculio.

(*Cæliodes inæqualis.*)

Fig. 86. *a*, berry, infested; *b*, larva; *c*, beetle—the hair-line showing natural length.

The larva of this curculio infests the grapes in June and July, causing a little black hole in the skin, and a discoloration of the berry immediately around it, as seen in the above figure. From the middle to the last of July this larva leaves the berry and buries itself a few inches in the ground, and by the beginning of September the perfect insect issues from the ground and doubtless passes the winter in the beetle state, ready to puncture the grapes again the following May or June. This curculio is small and inconspicuous, being of a black color with a grayish tint. It is represented above, the hair-line underneath showing the natural size. This insect is very bad some years, at others scarcely noticed, being doubtless killed by parasites. It is thus that nature works: "Eat and be eaten, kill and be killed," is one of her universal laws; and we never can say with surety, because a particular insect is numerous one year, therefore it will be so the next.

All infested berries should from time to time, as they are noticed, be collected and destroyed, and the beetle may be jarred down on sheets as with the Plum Curculio.

There are several Cut-worms which eat the young, tender shoots of the vine, and draw them into the ground below; they have destroyed, or kept back at least, many a young vine. The little rascals can be easily found and destroyed by digging for them under the loose clods of ground beneath the young vine.

There are many other insects injurious to the Grape-vine—large solitary worms—insects which lay eggs in the canes—others which make curious galls, etc., but the reader who desires an acquaintance with these, must refer to Prof. Riley's reports.

It will be more useful to the grape-grower to close this chapter on insects with a brief account of some of

THE BENEFICIAL SPECIES

which he will meet with, and which he should cherish as his friends.

Insects which are beneficial to man by feeding upon other insects that are injurious, may be divided into those which simply prey upon such injurious insects, without however being otherwise connected with them—the predaceous insects; secondly, into those which in their earlier stages live in or on their prey—the true parasites. This last class is represented only by two Orders, viz., the Diptera, or Two-winged flies, and the Hymenoptera (especially the families Ichneumonidæ and Chalcididæ). The egg is deposited by the mother parasite on or into the body of its victim, which is usually in the larva state, the parasitic larva feeding upon the fatty parts of its victim, and causing its death only after it has itself reached full growth.

Fig. 87.—Tachina-fly.

The most important parasites among the Diptera are the Tachina-flies, which in general appearance are not unlike our common House-fly. Those among the Hymenoptera are by far more numerous in species and more varied as to general appearance and mode of development. We select for illustration one of the most common forms, viz., a Microgaster of the family Ichneumonidæ, a small inconspicuous insect which is known to prey upon a large number of worms, and among others, also on the Hog-caterpillar of the vine. By means of her ovipositor the female Microgaster inserts a number of eggs in the body of the caterpillar while this is still young. The Microgaster larvæ develop within the caterpillar, and when full grown they pierce the skin of the latter, and work themselves so far out that they are held on only by the last joint of the body. They then commence spinning small white cocoons standing on end, as represented in Fig. 89, the caterpillar having by this time died and greatly shrunk. A week or thereabout later the Ichneumon flies begin to hatch from the cocoons.

Fig. 88. Microgaster.

Fig. 89. Shrunken larva of Chœrocampa, with Microgaster cocoons.

The Predaceous Insects include numerous species of all Orders, and we can here only select a few of the more important ones which have been observed in connection with the insects injurious to the grape-vine,

Ladybirds.—The Coleopterous family Coccinellidæ, or Ladybirds, comprises in the United States more than a hundred species, the larger of which may be readily distinguished by their round, convex form, the upper side being usually red or pink, handsomely variegated by black spots, which greatly vary in number and position; also a few species that are black with red spots, while the numerous smaller species are mostly of a more uniform dark color. With the exception of a few species which constitute the genus Epilachna, and a few allied genera, all Ladybirds are insectivorous, and, considering that many species occur in a large number of specimens and that the larvæ are very voracious, an idea may be formed of the great service performed by the Ladybirds in lessening the number of injurious insects. The Ladybird larvæ are especially fond of preying on the plant-lice, but they also feed extensively on the eggs and

Fig. 90.—Ladybird.

young larvæ of all insects. Whenever other food fails, they will even devour the helpless pupæ of their own kind.

We select for illustration one of our commonest species of Ladybirds, viz., the Convergent Ladybird (*Hippodamia convergens*), Fig. 90, *a* representing the larva, *b* the pupa, and *c* the beetle itself. The eggs of Ladybirds greatly resemble in appearance those of the Colorado Potato-beetle: they are orange-yellow, and laid in small groups on the under side of leaves. The larvæ are very active and most of them very handsomely colored, those of the Convergent Ladybird being blue, orange, and black. When full grown, they hang by the tail to the under side of a stalk or leaf and change to chrysalids. The perfect beetle is orange-red marked with black and white, as represented in the figure. It derives its name from the two convergent lines on the disc of the thorax. The larvæ of some of the smaller Ladybirds excrete a cottony matter, and one of them (belonging to the genus *Scymnus*) has been found to live underground, preying upon the root-inhabiting form of the Grape-phylloxera.

Thrips.—These are yellow or black insects, hardly visible to the unpracticed eye, but with the aid of a small magnifying glass at once recognizable by their narrow wings, beautifully fringed with long, delicate hair. The larvæ resemble in general form their parents, but differ not only in lacking wings, but in being of blood-red color. We refer to the Thrips and figure herewith given (Fig. 91), a black species with white wings (*Thrips phylloxeræ*, Riley), because it is one of

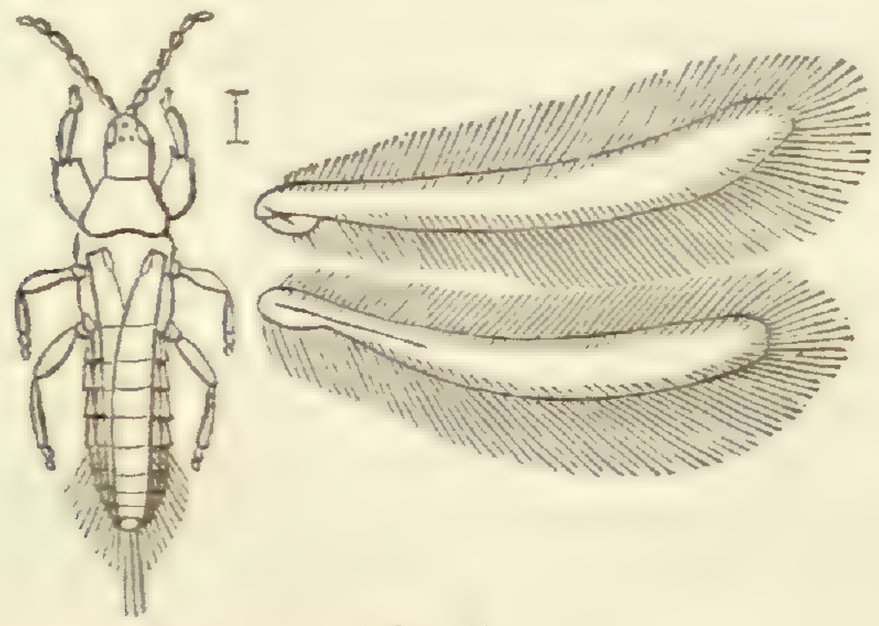


Fig. 91.

Thrips.

the most efficient enemies of the Grape-phylloxera, living within the leaf-galls caused by that pest, and doing more than any other species to keep the gall-inhabiting form of the Phylloxera within bounds. According to the recent classification the Thrips form a separate family, Thysanoptera, of the Order *Pseudo-neuroptera*.

Lace-wing Flies.—These play a very important rôle in the destruction of injurious insects, but here it is only the larva which does the beneficial work, the imago not being predaceous. These flies may be easily known by their delicate, greenish or yellowish wings, their brilliantly colored eyes, as well as by the peculiar, offensive odor emitted by them. The species represented herewith (Fig. 92) is the Weeping Lace-wing (*Chrysopa pluribunda*, Fitch), but there are many other species of this and allied genera which form the family Hemerobiidæ of the Order Neuroptera.

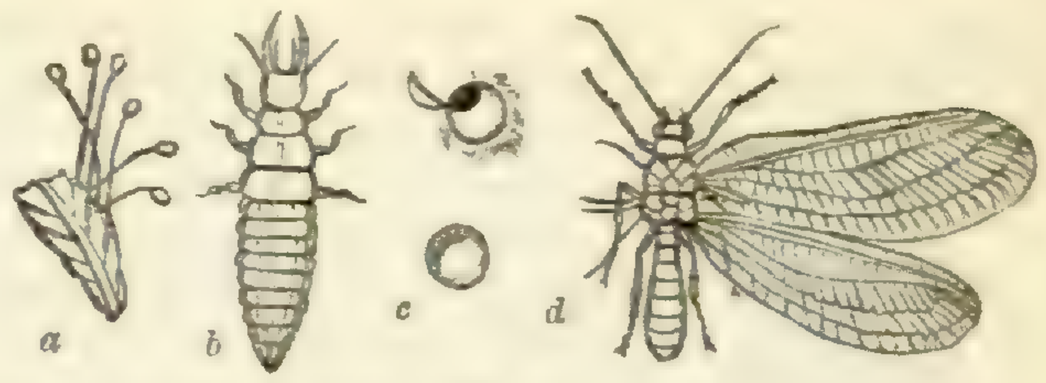


Fig. 92.

Lace wing Fly: *a*, eggs; *b*, larva; *c*, cocoon.

The eggs (Fig. 92, *a*) are adroitly deposited at the tip of long, silk-like stalks fastened to leaves and twigs. Sometimes these eggs are deposited singly, sometimes as shown in the figure, in little groups. The larvæ (Fig. 92, *b*) are very rapacious and move actively about in search of prey, which consists of soft-bodied insects and eggs of insects. When ready to transform, the larva winds itself up into a wonderfully small cocoon (considering the size of the insect which makes it and issues from it), as shown in Fig. 92, *c*. The imago issues through a neatly cut circular opening of this cocoon, also represented in the figure.

Syrphus-flies.—Associated with the Lace-wing larvæ we frequently find another class of larvæ or maggots of quite different appearance. They are blind and without legs, slowly moving about by means of stiff hairs with which they are covered, while others adhere to the leaves by means of a slimy secretion and move by alternately contracting and stretching out their bodies. In coloration these larvæ vary greatly, some being dirty-white or brown, while others are green or striped like caterpillars. Their prey is the same as that of the Lace-wing larvæ and their work is just as thorough. These are the larvæ of a large family of Two-winged flies, called *Syrphidæ*, very numerous in

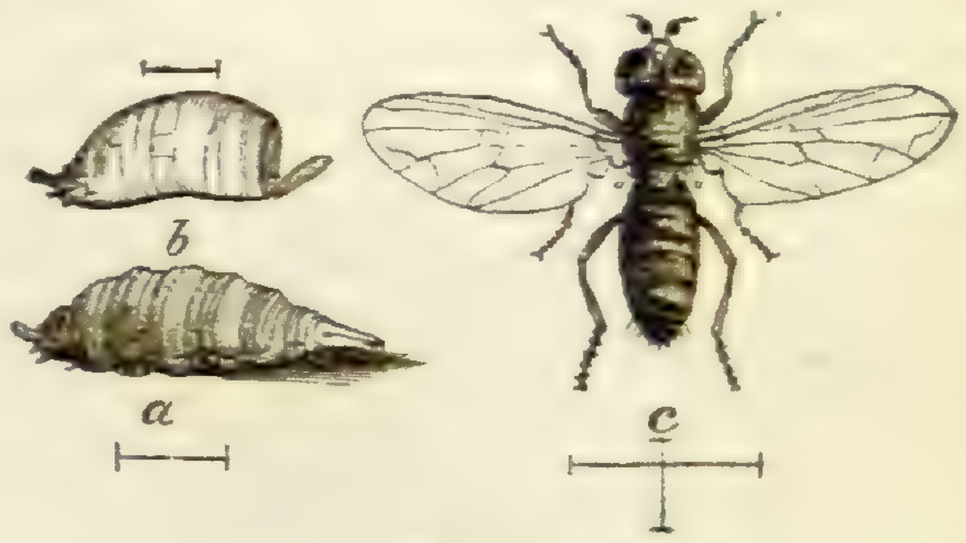


Fig. 93.

Root-louse Syrphus-fly: *a*, larva; *b*, pupa; *c*, fly.

species as well as in individuals. When ready to transform the larva becomes rigid, with the outer skin hardening and forming what is called a puparium, while the real pupa lies within this outer covering. In due time the fly issues from this puparium. The species figured in the accompanying cut (Fig. 93) is *Pipiza radicum*, Walsh & Riley), *a* representing the larva, *b* the puparium from which the imago has escaped, *c* the fly itself. This species lives, in the larva state, underground feeding both on the Apple-tree Root-louse and on the Grape-root-louse.

The Insidious Flower-bug.—This insect, of which we represent herewith a highly magnified figure (Fig. 94), is quite commonly met with on all sorts of plants infested by injurious insects; and anyone who cares to

I
No. 94.
INSIDIOUS FLOWER-BUG.

observe this tiny, handsomely colored bug, or its larva, will have no trouble in convincing himself of its usefulness. It is really amusing to see how this small bug, and its still smaller larva, not only assiduously suck plant-lice and insect eggs of all sorts, but also pounce upon worms much larger than themselves and pierce them with their short, three-jointed beak. They roam about everywhere on the plants in search of prey, and are frequently found within the Phylloxera-galls playing havoc with the lice. The Insidious Flower-bug (*Authocoris insiduosus*, Say) belongs to the Order Heteroptera, or True Bugs, and may be known by its handsome coloration, being black, reddish-brown and white above. Its larva is orange-colored, and closely resembles in general appearance that of the notorious Chinch-bug.

Besides the insects, you will still have other enemies to combat; foxes and birds, and, worst of all, some two-legged beings in human shape—thieves, who will steal your grapes if you do not watch and threaten to keep them off with powder and shot. We do.

GATHERING THE FRUIT.

Whether it be for the table or for wine, do not pick the grape before it is fully ripe. Every grape will color before ripe; some do so several weeks before, but when thoroughly ripe the stem turns brown and shrivels somewhat. The finest qualities, the sweetness and aroma of the grape juice are fully developed only in the perfectly matured grape; and we consider the *late* ripening varieties as far superior, especially for wine, to the *early* kinds, but, of course, only in such localities where *late* grapes will mature. This noble fruit does *not* ripen, like some other fruit, after being gathered. Always gather the grapes in fair weather, and wait till the dew has dried off before commencing in the morning. Cut off the clusters with a knife or grape-scissors, and clip out the unripe or diseased berries, if any, taking care, however, that the bloom be not rubbed off, nor any of the berries broken, if they are to be sent to market, or to be kept into winter. The bunches should be placed in shallow drawers or baskets, in which they are to be taken to the packing-shed, or some place under cover, and there assorted and packed.

For *packing* grapes for market, shallow baskets or boxes, holding from three to ten pounds, and especially manufactured for the purpose in all the principal grape regions, costing about one cent per pound, are used. In packing in boxes, the *top* is first nailed on and a sheet of thin white paper put in; whole bunches of grapes are first put in: the vacant places left are filled with parts of bunches, of same kind and quality, so that all the space is occupied and the whole box packed, as closely and full as possible, without jamming. Another sheet of paper is now laid on and the bottom nailed down. By this means, when the boxes are opened, only entire bunches are found at the top. The boxes are put in crates, or light large boxes, for shipment. Do not ship mixed inferior fruit—it will never pay; while uniform, good grapes will establish a reputation and command the best prices. Skill in handling and packing is only acquired by practice.

Grapes could easily be preserved for months by means of a cool room or cellar, where the temperature could be kept between 35° and 40° F. In a warm, damp atmosphere grapes will soon rot. Fuller recommends, for preserving grapes, to bring them first into a cool room, spread them out and let them remain there for a few days until all surplus moisture has passed off; then pack them away in boxes, placing the bunches close together, and thick sheets of paper between each layer. When the boxes are filled, put them away in a cool place; examine them occasionally and take out the decayed berries, from time to time, as they appear. If the place is cool and the fruit *ripe* and sound, they will keep from three to four months.

Another method by which grapes are sometimes successfully preserved till late in March, especially in France, is this: Cut a branch having two bunches of fruit attached and place the lower end, through a perforated cork, in a small bottle of water; seal the upper cut end of the branch and also the cork with sealing-wax. A little charcoal in the water preserves its purity. The bottles are then placed in a dry, cool room where the temperature is pretty even and never falls below freezing point, and are kept in an erect position (usually by a rack made for the purpose), care being taken that the clusters do not touch each other, and that every imperfect grape be removed as soon as it shows signs of failing. But very few persons, however, can bestow this care, and still less have a fruit room or cellar that can be kept so cool (40°).

A simpler method to preserve grapes is the following, lately recommended by a practical grape-grower, which seems to us well worth trying:—About a week before the grape is fully ripe, the bearing cane with its clusters is bent down to the ground and laid into a ditch, about one foot (30 cm.) deep, made for this purpose, without separating the cane from the vine. The bunches are dusted with flour of sulphur, then covered with soil to protect them from frost, and so made that the rain will run off. Grapes thus preserved were shown in March, which had retained their natural color and freshness, and tasted better than grapes of the same kind preserved in any other manner.

We have seen and tasted Concord grapes kept fresh and beautiful in a porous, unglazed earthen jar, manufactured for this purpose by T. J. Price, Macomb, Ill., who says: The clusters are to be laid carefully in them as soon as picked, and then taken to the cellar or basement, or some cool place where they can have both ventilation and moisture. The pores of these jars are filled with a salt solution as they come from the kiln, then the inside coated with a common thick limewash. The salt solution in the pores is intended to absorb the moisture and thus to produce a cool and even temperature inside the jar, and the lime is to prevent mould. These jars can be used again from year to year, only they should be first soaked in strong brine, and then whitewashed inside, before they are filled again with grapes."

Various other methods of preserving grapes fresh until late in winter have been recommended, but experiments have generally not been as satisfactory as

could be wished. Some varieties are found to keep better and longer than others, and in our Descriptive Catalogue the superior keeping qualities of our best kinds are always mentioned. In ice-houses, specially constructed for preserving fruit, grapes will keep in *apparent* good condition nearly all winter; but the appearance is deceptive—they are almost always unfit to be eaten.

The best mode of preserving the delicious juice of the grape, with its delightfully nutritious constituents, in a concentrated and almost imperishable form, is by

WINE-MAKING.

We have been urged to embody in this manual a chapter upon this subject, and, notwithstanding the assurance that, within the limited scope of this Catalogue, we think it impossible to furnish anything that would be valuable, either as a guide to the inexperienced or as a *vade mecum* to the wine-maker, we have been called upon, again and again, by many of our customers for some concise information which might aid the intelligent farmer and the amateur grape-grower to transform their surplus fruit into that health-giving beverage, "wine." The books on wine-making to which we have referred were either not accessible, or too costly, and contained so much that was unnecessary, to say the least, that we finally concluded to write this brief treatise, which, however, should be regarded as a collection of mere hints, being only intended to give the inexperienced a correct idea of the general principles of wine-making, and to contain some plain directions that may guard against false theories and wrong practice.

Those who intend to make wine, as a business, on a large scale, and who desire full information on all its branches, cannot expect to find it in this brief manual. Moreover, wine-making is an art which, however simple, cannot be acquired from books only, but must be learned PRACTICALLY; and we can only repeat our advice, given in the former editions of this Catalogue, viz., to engage some experienced "wine-cooper" who knows how to make and treat wines, who has learned and has been accustomed to attend to wines from his youth, and who will watch over and nurse them with the care and cheerfulness of a mother to her infant, until you or your son may have practically learned from him. Such a man you may have to pay well, and you may think you cannot afford it; but to learn from sad experience, unless on a very small scale, would prove, by far, more costly and unprofitable.

Thus, without presuming to present anything new in this chapter, we hope that the grape-growers of this country may find therein as much information of practical value on so vast a subject as could be condensed in so limited a space.*

I. *Wine, its nature and substances, its formation and classification.*

Wine is the properly fermented juice of the grape; its unfermented juice is called *must*. The product of vinous fermentation of other saccharine juices of plants and fruits is also often called wine, but none contain the life-giving, restorative qualities, the exquisite taste, the delicate bouquet, that harmonious combination of substances that we enjoy in the properly fermented juice of the grape. At all events we, as grape-growers, have to deal with the product of grape-juice only, and it is of this alone that we intend to speak.

However important it is to fully know the nature and chemical substances of wine and the law of fermentation, we must restrict ourselves to the absolutely necessary; it may also suffice, for most practical purposes, to know that the juice of the grape contains, chemically speaking:

1. *Sugar*, which afterwards, by fermentation, is transformed into alcohol. Most of the cellular substances in the unripe grape have transformed themselves, during the process of ripening, into sugar; the residue of these are thrown out during fermentation and sink to the bottom. The less ripe the grapes, the more of these substances and the less sugar will be contained in the must.
2. *Acids*,—tartaric, tannic, and other acids, more or less, according to the degree of ripeness and the character of the grapes.
3. *Albumen*—a nitrogenous substance, plainly visible in the white scum of the must. Also: some resinous substances, gum, affecting the body and taste of the wine; coloring matter, adhering to the skin, giving the color especially to red wines; and so-called extractive matter. All these substances, and many more, which have been chemically analyzed, are combined and dissolved in about three to four times their quantity of WATER in the juice of the grape.

As long as this juice is inclosed in the skin, which protects it from contact with the oxygen of atmospheric air, so long no fermentation can take place. As soon as the grapes are mashed, the influence of the air begins to act thereon. Spores of ferment are contained everywhere in our atmosphere and develop themselves under certain conditions; they grow and augment in the must (as can be seen by the aid of a microscope), decomposing the sugar, setting the fluid in motion, and forming alcohol; at the same time the other substances combine, transform, and form new substances. Thus, however clear the unfermented juice may be, it becomes turbid by fermentation; the albumen commences to oxydize; the alcohol, while forming, separates the coloring matter from the skin; carbonic acid gas is formed in the mass, pushing up the firm parts and forming a dense cover over the liquid; the gas is developed in increasing quantities and escapes with a bubbling noise, and the heat of the fermenting mass is augmented. Gradually all these phenomena disappear, fermentation becomes less stormy, and the undissolved substances and new-formed matter fall to the bottom. The *new* wine is formed; by degrees it becomes almost clear, but fermentation still continues, slowly, almost imperceptibly; there are still substances of the must, finely distributed, floating in the young wine, and these substances, under an increased temperature, create anew a stronger fermentive motion, until the wine is clear and fully developed.

* There are but few books on wine-making written in the English language. HARASZTHY'S "Grape Culture and Wine-making" was published (by Harper & Bros., New York, 1862) more than twenty years ago. Among the many scientific German works on this subject, the new "Handbuch des Weinbaues und der Kellerwirthschaft, von Frhr. A. v. Babo, &c., Berlin, 1883," is probably the best and most complete.

The more sugar grapes contain, the more alcohol will be developed in the wine under proper fermentation, and the more durable will it be, from the fact that the floating yeast more effectually settles. The durability of a wine depends largely on the quantity of the remaining undissolved substances in the same; it is therefore necessary to free it from those substances as soon as possible. The more regular, uninterrupted and complete the first fermentation, the more of the dregs or lees will have settled and the better the wine will become; particles of the sugar, however, remain floating undecomposed until after the second fermentation, usually during the time of the next blooming of the vines. Some of the acids, tannin, and albumen, are also generally precipitated and settle only during the second summer; and not till then can most wines be considered completely developed. Even after that period there is a further change perceptible in most wines; they become milder, and not only their taste but also their effects change. Old wines are considered less intoxicating and more beneficial; but there is a limit to this improvement by age, and very old wines become rougher, and less palatable, unless younger wine is added from time to time.

It is self-evident that the qualities of wine depend on the combination and proportion of the above mentioned substances in the must, and their proper development during fermentation. From analysis of the best wines we find that a good wine should contain from 10 to 12 per cent. of alcohol, from 1 to 3 per cent. extractive substances, and ½ per cent. (5 to 6 pr. mille) acids, bouquet and aroma in proper proportions (which cannot be expressed or measured by any scale).

The alcoholic strength of wines can NOT be measured by any of the so-called wine-scales; these show the specific gravity, but never the alcoholic strength. A small distilling apparatus, *Alambic Salleron*, would be required for this purpose. (Instructions in its use accompany this instrument.) The wine-maker may, however, know in advance, from the sugar percentage of his must, how many per cent. of alcohol his wine will have, after complete fermentation, calculating 1 per cent. of alcohol for every 2 per cent. of sugar, measured by *Oechsle's* well known must-scale. For a correct examination of the must, it should be clear (filtered), not yet fermenting, and its temperature about 65° F. (14° R. or 17° C.) Tables showing the percentage of sugar for the various degrees of Oechsle's scale may be obtained with the instrument. To determine the acidity of wines, as well as of must, we have now in Twichell's acidometer a safe and practical instrument.

Wines are generally classified (according to their saccharine substances) as follows:

(1) DRY WINES, in which all the grape sugar has been absorbed or transmuted by fermentation.

(2) SWEET WINES, which still contain a considerable quantity of sugar.

The former might be called the Wines of the North; the latter, the Wines of the South. The northern wines contain more acidity, and are consequently of a richer perfume, bouquet; the southern wines lack acidity; the spirituous element, sweetness, is predominating; they generally have no bouquet, and even the strong muscadine flavor of some southern grapes disappears in a few years.

With regard to color, wines are classified as WHITE and RED wines, though there are many shades between the two extremes, from the pale greenish-yellow of the Kelly Island Catawba to the deep dark red of our Norton's Virginia. The intermediate shades are generally not as well liked. Sometimes wines are also classified as STILL and SPARKLING wines, a merely artificial classification, as the sparkling is simply the result of a peculiar mode of manipulation (by fermentation in closed bottles, so as to retain and hold the carbonic acid gas)—a manipulation too complicated to be here described, or to be of any practical use to most wine-growers.

We shall now endeavor to proceed to the *modus operandi* of the grape-grower as a producer of still wines.

II.—*Gathering the Grapes—Mashing and Pressing.*

Some are impatient to gather their grapes for wine-making as soon as they color, others delay until they are over-ripe. Both are wrong. Not until the grapes have reached their full sweetness, the berries separate easily from the stem, the stems have lost their freshness and have become harder, dryer, brown or woody, are they ripe; but when they have reached that state of maturity gathering should not be delayed. It is impossible to describe or determine with exactness the point of full maturity; some varieties, especially those deficient in acidity, will reach it sooner than others, and in bad seasons grapes will not reach a perfect degree of maturity. In such seasons it would be even more useless than in favorable years to wait for an improvement by "after-ripening," as, aside from the danger of their entirely spoiling by late rains and frost, the loss in quantity would be far greater than the gain in quality. Grape-growers cannot afford to risk a large portion of their crop for a little better quality, especially as long as the latter is not sufficiently appreciated and paid for in this country. The dangers of loss are, of course, greater in the northern than in the more southern States, and in some localities the fall season is so constantly dry and warm that the above rule is thereby modified; moreover, some varieties improve more than others by getting over-ripe, and are far better adapted for late gathering. As such, we would especially name the Norton's Virginia.

To obtain a wine of superior quality it is necessary to SELECT the best and most perfectly ripened grapes, of varieties best adapted for wine, and to press them separate from those which are poor in quality or imperfectly ripe. But, instead of sorting the gathered grapes, it is generally considered more advisable—especially in seasons when the grapes do not ripen evenly—to sort them while gathering; that is to say, to pick first the best and ripest grapes, and let the others hang on the vines several days to ripen more fully; thus making two gatherings from the same vines. We here desire also to caution wine-growers not to plant too many varieties. A few kinds, suited to their locality, will pay best and make better wine. By this we do not wish to discourage the testing of different and new varieties, in small quantities, with a view to progress and improvement; but the planting of a great many varieties, each insufficient in

itself, would necessitate the gathering of their grapes while some are not sufficiently ripened, others over-ripe, and these mixed together, cannot produce good wine. It almost seems unnecessary to say, that white-wine grapes and red-wine grapes should each be gathered and pressed separately. Grapes should be gathered with knives or scissors adapted to the purpose, and not torn from the vines merely by the hand. Some gather in baskets, others in hods, made for the purpose; but, whatever kind of vessels may be used, it is *important* that these as well as all vessels used in wine-making should be PERFECTLY CLEAN. Plenty of fresh water for washing them is, therefore, an essential requirement. Some first use hot water, to which some lime and salt have been added, in order to remove every trace of fungus which may have formed, and, after leaving such water in the vessels about 24 hours, rinse the same with plenty of pure cold water.

The grapes being gathered, we now come to—

THE MASHING OR CRUSHING, which is generally done in a press-house. For this purpose we use a WINE-MILL, consisting of two roughly notched rollers, so arranged as to be moved by a crank and cog-wheels in opposite directions, and having a hopper over them. Its construction is so simple that no explanation is required. The mashers should be so adjusted as to avoid the laceration of the stems and combs of the grapes, yet close enough to break each berry without crushing the kernels. Some wine-makers believe that the stems should be removed from the berries before mashing, which is done by the aid of sieves or rasps; others contend that the wines are not materially improved thereby, and that for red wines especially it is better *not* to remove the stems; owing, probably, to the tannin which these contain. But when the grapes have ripened poorly, and had to be gathered in that condition, it is necessary to remove the comb, which, being green, would still more increase the acidity and roughness.

The press-house or press-room need not be in or near the vineyard, but should always be close to, and, best, immediately above the wine-cellar. It might be divided into two parts—one for mashing and pressing, the other for the fermenting-room. The press and mill should be placed in the centre of the press-room, leaving space enough to go all around the press in turning the screw with the press-beam.

THE PRESSING, whereby the must is separated from the mashed grapes, called the marc or pommace, can be done with any kind of a cider-press; for large quantities, however, good screw-presses, specially made for wine, are generally used; and the principal qualities of a good press are—to require but little force, and to afford abundant means of outflow to the juice.

The mode and method of using the press, before and after fermentation, differs widely, according to the kinds of wine we intend to make. Before speaking of these, it is necessary to remark that the temperature of the room, while fermentation is going on, should be kept uniform without interruption: here in Southern Missouri at about 70° Fahrenheit (about 17° Réaum.);* in the South, where wine-making commences in August, it should be so arranged that it can be kept as cool as possible, and farther North so as to KEEP IT WARM—by the aid of fire, if necessary. A fireplace and kettle may also otherwise prove very useful in the Press-house.

To the necessary furniture of the press-house fermenting-vats also belong, and may be ordered of any suitable size (not less than 100 gallons) from any experienced cooper; these are best made of poplar-wood; then good pine or cedar tubs and pails, not forgetting the must-scale, heretofore mentioned; and, finally, sufficient hose to run the fermented wine down the cellar. A good common house-cellar, cool in summer and safe against frost in winter, will fully answer the purpose.

For those, however, who intend to make wine on a large scale, a separate WINE-CELLAR will, of course, become a necessity. A good wine-cellar should be dry; in damp cellars the casks become mouldy, the wine gets a bad taste and spoils. The cellar should be well drained, that it may be daily washed, for which purpose it must be amply supplied with water; it should have a sufficient number of air-holes to regulate ventilation and temperature. The temperature of a wine-cellar should not rise above 60° F. (12° R.) in summer, nor fall below 50° F. (8° R.) in winter. Such a cellar, with press-house and fermenting-room, store-room for casks, pumps and other tools, costs thousands of dollars, and the additional expense of having plans and specifications made by an able architect or builder, well informed as to the requirements of a good wine-cellar, will be money well spent; it will protect you from great losses, which are the inevitable result of poorly and incorrectly constructed wine-cellars. In places where deep cellars are impracticable or too costly, good wine-cellars can also be built above ground, on the system of the American ice-houses, whose double frame walls are tightly stuffed with straw, sawdust, ashes, or other substances which are non-conductors of heat; the roof should be well projecting and heavily covered with straw.

As necessary *furniture* and *tools* of a producer's wine-cellar must be mentioned: supports and layers of sound timber on which the casks rest, about 18 inches above the floor and at least 15 inches from the wall, so as to enable you to examine and to clean the casks at all times. The CASKS should vary in size from 160 to 500 gallons (the capacity to be distinctly marked on each). Very large establishments will, of course, also use larger casks. They should be made of good, well seasoned white oak wood. The larger sized casks should have so-called "man-holes," through which a man can slip in and clean them thoroughly; also, wooden funnels, pails and tubs, which can be obtained from any cooper; faucets, funnels; thieves for drawing samples out through the bunghole; rotary pumps with rubber hose, to facilitate the drawing off from one cask into another; bunghole-borers, wooden hammers, and various kinds of other tools; sulphur-strips and hooks, candles and candlesticks, gauge sticks and measures, wine-glasses for tasting; small step-ladders, and other utensils which are demanded in the course of operations, and may be seen in any properly furnished wine-cellar.

New casks, however, are not ready and fit to receive wine; they must first be rinsed with boiling hot water

* In Northern wine regions a lower temperature (about 60° F. = 12° R.) will favor a slower fermentation.

—the casks must, however, be emptied again before the water gets cold—they are then filled with fresh water daily during several days, then again a few gallons of hot water, in which common salt (two ounces to each gallon) has been dissolved, are to be poured into the empty cask, the bung firmly put in, and the cask rolled or turned until every part has been in contact with the hot salt water. After this operation (considered unnecessary by some) the cask is treated in like manner with two to four gallons of fermenting or boiling hot young wine. This is called making new casks *wine-green*. Another process much in use, is to put in the cask a hot lime-wash, made of unslaked lime and hot water, forming a kind of milk; the cask is turned about, so that its entire inside becomes coated with the mixture; after which the cask is washed with clean water, and finally rinsed with hot wine, as before. If this last operation is not convenient, pour in a pint of pure alcohol, or brandy, and ignite it, leaving the bung slightly *open*. The fumes of the burning brandy will free the wood from its unpleasant taste, which would otherwise taint the wine. In large modern wine-houses steam is used to great advantage in this important operation.

When a wine-cask is emptied, and not at once refilled with other wine, it should be cleaned, and, when dry a small piece of sulphur (about 1 inch square) should be burnt in the cask, which is then to be closed tightly by the bung; when it is again to be used, it must be examined as to tightness, by pouring water into it, and, if leaking, is to be made tight by filling it with water and driving the hoops until it ceases to leak. It must also be examined as to the purity of its air, which can be tested by a small piece of burning sulphur strip or paper. If extinguished when brought into the cask, this indicates the impurity of its air, from which it may be freed by the common small bellows, and by then washing it thoroughly, as above indicated. Old casks and barrels which are to be used for wine must be watered and treated in like manner as new casks to be made wine-green; but never use a mouldy or sour cask; better burn it up than to attempt its cure.

WHITE WINES.

The white wine grapes—and as a rule, no black or blue grapes should be used for white wine—are to be mashed, as soon as they are hauled to the press-house. This is best done in a grape-mill, placed above the fermenting vat. The vat is covered with a board or cloth, as soon as filled, and the mashed grapes are there allowed to ferment from 24 to 48 hours. The juice which may then run off through the faucet inserted in the spigot hole near the lower end of the vat, is put into a well prepared, clean cask; then the entire balance of the mashed grapes is pressed, and the juice which comes off from the press is added to that obtained without pressing.

The cask into which the juice has thus been put should not be completely filled, nor the bung hole closed, as long as violent fermentation lasts. During that time the (carbonic acid) gas which rises and fills that space, prevents any access of air, and the old method of closing the bung-hole by a grape leaf, over which a small sand-bag is placed, is still preferable to any complicated syphon. Care must be taken that the sand-bags remain clean, for if soaked by the must or by wine, vinegar would form in them; some, therefore, use a cork stopper, holding a doubly bent glass- or rubber-pipe leading into a small glass jar, half-filled with water, through which the gas escapes without admiting the outer atmosphere. A funnel-shaped bowl with an air tube or chimney in the centre, covered by an inverted cup or tumbler, which forces the escaping gas to pass through the water in the bowl, combines the same advantages and is less apt to break or get out of order. When the principal fermentation has ceased, or is no more perceptible, the cask should be filled up with similar young white wine, and then closed with a tight fitting wooden bung. Mohr recommends a cork bung perforated by a glass tube filled with cotton, whereby the atmospheric air would be admitted without any germs of fungi. Babo recommends an ordinary wooden bung, perforated by a few small air holes, so arranged that an india-rubber ring will close it against the air, yet permit the escape of any carbonic-gas by the elasticity of the ring.

White wine can also be made from black or blue grapes, as the coloring matter is merely in the skin and is dissolved only during fermentation; consequently, by pressing the grapes at once, as soon as mashed (or even without first mashing), and before fermentation commences, thus separating part of the juice of the husks, a white or light-colored wine is obtained. The pressings, still containing a greal deal of juice, are then thrown into the fermenting-vat, some sugar-water is added to replace the portion of the juice heretofore withdrawn by a light pressing, and, after fermenting for several days, they are pressed again, and a red wine is produced from the same grapes. While we do not recommend this method, and consider both the white wine and red wine thus made as inferior to what could have been produced from the same grapes had their juice been allowed to ferment altogether on the husks, it certainly does not deserve that vituperation which has been heaped on our producers, who, in view of the failure of the Catawba and other white-wine grapes, resorted to that method with the Concord. Hereafter it will scarcely be practiced by any, since there are a number of productive white-wine grapes planted, and especially since grape-juice is cheaper than sugar-water.

After the main or violent fermentation the must will have become clear young wine, provided that fermentation has been uninterrupted and complete; having become clear, in December or January, it is drawn off, from its sediment into clean, properly prepared wine casks. By this drawing off the young wine again becomes cloudy, only to become clearer in March or April following, when it is again drawn off before its second fermentation. As soon as it is apparent that, with the rise of temperature, in May, this second fermentation approaches, the bungs must be opened, some wine drawn off from the full casks to make room for the inevitable expansion, and the sandbag or other apparatus is placed on the bung-holes until the termination of this second fermentation, when the yeast and other impurities will have been precipitated and settled, and the finished wine must be drawn off again into clean, well-prepared casks. The proper and frequent *drawing off* is one of the most essential opera-

tions in wine-making. The object thereby aimed at is not merely to separate the *young wine* from its sediment, the dregs or lees, but to bring it in contact with the atmospheric air—while in *older wines* such contact must be carefully avoided. In drawing off the young wine we use a vulcanized rubber hose, one end of which is placed in the wine, so as not to touch the bottom of the cask, and from the other end the air is drawn, by the mouth, until the wine flows through it into wooden pails or tubs below. By a mere pressure of the two fingers the hose is closed and the flow stopped at will; the clear wine is filled into fresh casks by the aid of the wooden funnel, heretofore mentioned among the necessary tools. Rotary pumps, specially made for wine, are now generally used for drawing off older wines; but, as long as the wine is not quite and permanently clear, contact with the air during the drawing-off process is necessary. Permanent clearness, however, is often reached only after the wine has passed six or more times through this process.

This slow process of clearing or finishing the wines is accelerated by fining (with isinglass, gelatine, eggs, &c.), by filtering, by aërating, by heating (Pasteurizing), and other artificial methods, which require special skill and apparatus, and which belong more to the manipulations of the wine-dealer's cellar than to those of the producer.

RED WINES

differ from white wines not merely in color, derived from the black or dark blue grape-skins, but these also contain other valuable ingredients, especially more tanin, which gives to red wines a peculiar character and important hygienic qualities.

The *red*-wine grapes need not be crushed as soon after picking as the white-wine grapes. Many authorities recommend that their stems be first removed, as these contain and impart more acidity than is desirable in red wines. The grapes are usually fermented from one to two weeks in upright, firmly closed fermenting vats, in which a perforated double or false bottom is placed, at about one-fourth the space from the top. This false bottom is to prevent the rising of the husks to the top of the liquid, as they would do in a fermenting tub without such double bottom, when they would have to be pushed down into the liquid several times each day, to prevent the formation of acetic acid in those husks, and to extract from them all the color and other valuable substances. The vat is, of course, first filled with the crushed grapes, then the double bottom is put in, so that it will be covered by about three inches of pure juice, which may be drawn off by the opening or faucet below, and poured in again after the double bottom is placed over the grape-mash. The fermenting bung or funnel is used the same as in white wines, to exclude the air and permit the escape of the carbonic acid gas. In various wine countries somewhat different methods are in use, but in all and every one of them success depends on a rapid, complete and uninterrupted fermentation, and this depends on the temperature of the fermenting room, which should be kept at about 75° F. (18–20° R.) by artificial heating if necessary.

The further treatment of red wines is entirely the same as that of white wines, and red wines are generally much sooner ripe and finished if *at first* well fermented; but if this has not been well done, its after fermentation and cure will be the more difficult; such red wines will receive a disagreeable sweetish-sour taste, and all the fining will sooner be harmful than beneficial.

All wine-books contain more or less voluminous instructions upon various methods of improving the must which is to be made from sour grapes, gathered during unfavorable seasons, and of curing wines which have suffered either from defective fermentation, or through errors and neglects in their treatment.

We do not pretend to condemn all these methods, as many others do: but while we consider it justifiable that the producer endeavor to improve his wine by an addition of pure sugar to the must, if it has been insufficiently developed in the grape, or to add a little pure spirits to the wine, to make it more durable; and while we cannot see anything reprehensible in the fact that wine-producers will try to extract from the pressed husk the large portion of wine-making properties which they still contain, to make a very good, wholesome and cheap domestic wine,—especially as the revenue laws make their distillation impracticable,—we do condemn the use of any and all foreign deleterious substances, and of all others, so-called, cellar mysteries. We would also warn the inexperienced against the use of any and all other attempts to improve or to add anything to their wine, as these manipulations require scientific accuracy and practical skill, otherwise the result will surely be no improvement, aye, will most likely prove ruinous. Moreover, the knowledge of the chemistry of wine is as yet very imperfect. Quite lately Adolph Reihlen, of Stuttgart, invented a process which upsets former scientific doctrines. He demonstrated that the fermenting properties exist exclusively in the grape-skins, and that old wines can be readily brought to a new fermentation and restored by the use of clean and pure grape-skins and by the action of heat, applied to the wine. But his method is patented, and, therefore, cannot here be described. Neither is the manufacture of sweet wines, cordials or liqueurs, nor that of sparkling wines, within the scope of this brief manual.

A natural wine, the pure juice of the grape, properly fermented and educated, will always be superior to any artificially improved wine, and the only necessary conditions to obtain such superior natural wine are:

1. Good ripe grapes.
2. Clean vessels and utensils.
3. A proper, uninterruped high temperature during fermentation.
4. Drawing off, as herein described, in December or January.
5. Drawing off again in March or April.
6. Drawing off after second fermentation.
7. Keeping the casks full, by refilling from time to time with good similar wine.

If these essential conditions are strictly complied with—and they are neither many nor very difficult—wine making will be a success.

Some, however, say that American wines are very inferior, "scarcely fit to drink"! This was the preconceived opinion of foreigners and of a great many Americans too; also, most American hotels and restaurants keep none but foreign wines—or else native wines under foreign names and labels;—and we are often asked whether we hoped ever to produce as good wines here as in Europe? Now, while we are far from presuming that "we can make wines which will rival and surpass the best wines of France, Germany, and Spain,"* we do claim that we are producing some very good wines, and shall before many years, by planting our best varieties and by progressing in the art of wine-making, fully equal the average production of the wine-countries of Europe. This is no idle boast, no mere opinion of our own. The good qualities of American wines are now appreciated by the best and most impartial judges. Prof. St. Pierre, the late celebrated Director of the Agricultural School of Montpellier,† says in his "Memoir" (*Extract from his Rapport*):

"The study of wines furnished by American varieties has engaged my whole attention since 1875..... The musts of the following varieties—*Jacquez*, *Rulander*, *Cynthiana*, *Black July*, *Elvira*, and many others, are found to be sweeter and richer than the musts of our best southern varieties ..... The fine mountain wines of the south of France find their equivalents in the *Black July*, *Jacquez*, *Norton.*, and *Cynthiana;* color, alcohol, savor, body, and keeping qualities, none are missing, and their products are equal to the good wines of the Provence or of Roussillon..... Trade will also find American wines for blending, similar to those of the *Narbonne;* the color and richness of the *Jacquez*, *Norton*, *Clinton*, &c., do not yield in the least to the deep-color wines of France. Of those named, none except the *Clinton* wines have a disagreeable taste; and even of the Clinton we shall obtain, by blending, age, clarification, &c., a wine that is fit to enter into general consumption.

In the category of white wines, some American varieties offer equally valuable types. The wines of *Diana* and *Elvira* remind us of our good *Piquepouls;* the *Cunningham*, made as a white wine, presents characteristics approaching our *Grenache* wine..... It is thus evident that besides grafting, which enables us to obtain our French wines on American stocks, the direct cultivation of many American varieties can give us wines of true value..... I hope that the prejudice against these wines by persons who never tasted any others than *Concord* and *Isabella* wine, will finally fall before the evidence of experience."

May we not hope that the prejudice of our own American people will finally yield, and will rather trust to their own palates than to foreign labels and high prices?

But we are aware that there exists still another prejudice—one which condemns *all wines*, both native and foreign, from fear of their intoxicating effects. And we cannot close this chapter without a few words on

* Am. Wine and Fruit Grower, August, 1882, page 75,

† He died December, 1881.

THE TEMPERANCE QUESTION.

Wine is itself an apostle of temperance. The best medical authorities, such as Dr. Lunier, Medical Inspector of the Insane Asylums and Prisons of France, and at the same time Secretary of the Temperance Society, has shown by able researches and reliable statistics that the ratio of percentages of disease and crime, attributable to alcoholic excesses, DECREASED in proportion as in each district the consumption of wine and beer increases; that the evils of intemperance are worse in the districts where wine and beer are scarce; that natural wine and beer cures the thirst for distilled spirits instead of exciting it. The French Temperance Society aims to repress entirely the circulation and sale of bad spirits—discovering modes of detecting them, punishing adulterations, and encouraging the use of pure, cheap wine, beer, tea, and coffee, as the best means of curing the thirst for distilled alcohol.

American travellers, returning from Southern Europe, who were strong opponents of wine before they visited those countries, now testify that where wine is most abundant, cheap, and generally used by the people, drunkenness does not exist. The French Temperance Society receives the hearty support of all the leading physicians, scientists, legislators, and of all intelligent men. Such a Society in America, if properly organized, would receive similar support from all intelligent citizens of our country; but our Temperance Societies here, aiming after absolute prohibition, regardless of the principles of personal liberty, injure the very cause which they advocate with more zeal than wisdom.

From time immemorial the art of making wine and its uses have existed all over the world; and wheresoever the attempt has been made to suppress it (as in China), the use of enervating opiates has taken the place of invigorating wine. Let wine and beer drinking be prohibited, and the use of opium, the secret tippling of strong drinks, the increase of vice and intemperance, would be the consequence. In all civilized countries there is scarce a festive board without wine. The church uses it in her sacred service as the symbol of God's choicest gifts; the physician prescribes it as a health-restoring tonic to the sick and convalescing. We do not deny that wine is intoxicating if used to exces; but "good wine is a good familiar creature if it be well used."

Grape culture extends over hundreds of thousands of acres, the annual production of wine has reached hundreds of millions of gallons; a mere insignificant proportion of the grape production can be utilized for the table and culinary purposes; none of our American varieties are adapted for making raisins: thus, grape culture is and will ever remain inseparable from making WINE—"*that makes glad the heart of man.*"—Ps. civ. 15.

DESCRIPTIVE CATALOGUE.

NOTE TO THE READER.—The following Descriptive List of American Grapes includes all varieties which have ever received the attention of Viticulturists, and even all novelties of which we could obtain any reliable information. The descriptions are probably the most complete that have so far appeared, and are the best we could give with the resources at our command. We are well aware, however, of their incompleteness, compared with the exact method of European Viticulturists.

The international ampelographic formula for such descriptions demands—

1. The *name*, synonyms, origin, home of the variety, and where mostly cultivated.
2. *History*, literature of the variety, and its illustrations.
3. *Vine*, its general characteristics; vigor of growth; fertility, hardiness; resistance to frost, to parasitic diseases, to insects; requirements of climate, soil, culture, &c.
4. *Wood*, heavy or light, long or short-jointed; color of wood; character of eye or bud.
5. *Shoots*, pushing early or late, smooth or hairy, color, &c.
6. *Leaves*—foliage, its size, shape, sinuosity, (lobed), upper and lower surface, (smooth, glossy, hairy, wooly.)
7. *Petiole*—stem of the leaf, long or short, hairy or smooth, green or red.
8. *Leaf-fall*, early or late, change of color, (to yellow or red, preceeding fall,) &c.
9. *Bunch*, size, shape, shouldered or not, compact or loose.
10. *Stem*, peduncles, tendrils, long or short, smooth or warty, intermittent or continuous, &c.
11. *Berries*, size, shape, skin, color, pulp or flesh, taste and use; for table or for wine, or both; keeping quality.
12. *Period of ripening*, early, medium, late,—and other characteristics.

AMPELOGRAPHY, the description of grape-vines, is comparatively a new science, and a complete description of American varieties according to this international formula is as yet impossible, and must be left to the future, to abler hands, to botanists. It would require large subventions, such as the Governments of Europe and her rich patrons of viticulture have bestowed on Ampelographic Works, illustrating them with large, fine, colored Plates, which are very costly. We have tried to furnish the best possible at a mere trifling cost, within reach of even the humblest grape-grower.

Moreover, we consider all description by words inadequate, and even "figures" seem but insufficient aids. It is only by familiarizing one's self with the CHARACTERISTICS OF THE SPECIES to which a variety respectively belongs that descriptions become thoroughly intelligible; knowing the distinct characteristics which, by community of descent, all varieties of a certain class possess, their minute description according to the European formula becomes almost unnecessary, as will be found by studying the excellent treatise of Dr. G. ENGELMANN on the classification of the true Grape-vines of the United States, written for our Catalogue (pages 9–20).

We have, therefore, coupled with each variety the *species* to which it is (or seems) most closely allied, or from which it orignated. First is given the STANDARD NAME in FULL-FACE type; then the SYNONYMS in SMALL CAPITALS; then the SPECIES in *italics*, abbreviating them thus: (*Æst.*) for Æstivalis, (*Labr.*) for Labrusca, (*Rip.*) for Riparia, stating the *parents* from which it originated, as far as known or supposed.

The description of leading varieties and of the most promising novelties is printed in larger type (Bourgeois): the description of varieties which are generally discarded, or planted only in some particular localities, and not very desirable except for amateur culture, also of new varieties but little known and not yet disseminated, are printed in smaller type (Minion).

The descriptions of the more important varieties contain also some notes on their roots and wood-growth, based on our observations only; under different conditions of soil, climate, &c., these may vary materially: as also the weight of must, which is intended to show the *sugar* in degrees on Oechsle's scale, and the *acid* in mills by Twichell's acidometer, in favorable seasons, in our own vineyards.

Of *new* varieties not yet sufficiently tested, we have given the descriptions as received from their originators, omitting what may in future prove to be undue exaltations, as several years of observation are necessary to determine with accuracy the character and value of a variety; and even the praises by impartial authorities, which we quote in the description of promising new varieties, must be received with some allowance.

In order to bring the Illustrations of Grapes on the same or adjoining pages with their descriptions, slight deviations from the exact alphabetical order were unavoidable. If any variety is not immediately found, please refer to the Index.

Adirondac. (*Labr.*) Originated at Port Henry, Essex Co., N. Y. (first noticed 1852). Probably a seedling of the Isabella, being much like it in growth and foliage. Ripens very early, about the same time as the Hartford Prolific. *Bunch* large, compact, rarely shouldered; *berry* roundish-oval, large, oblong, black, covered with a delicate bloom, transparent, with a tender pulp; thin skin; juicy and vinous; quality *best* "when you can get it."

Reports generally unsatisfactory. A slow, tender grower. Young vines have mildewed, and older ones need protection. Blooms early, and fruit destroyed by late frosts. Roots very weak and tender. An amateur grape only.

Advance. (*Hybr.*) One of Rickett's* earlier seedlings, a cross between Clinton and Black Hamburg. "A superior grape, and at that time (1872), perhaps in advance of all his others. The *berry* is black, with a slight blue bloom, roundish-oval; *bunch* large, long and shouldered: flesh too good to describe, except pomologically, and then I think it would read '*best.*'" —*F. R. Elliott, N. Y.*

Bunch large, *berry* medium, thin skin, scarcely any pulp; sweet and very sprightly—decidedly one of the

* See *Rickett's* Seedling Grapes.

best very early grapes we have yet met with. Vine healthy, vigorous and productive, but the fruit rots badly. Fully ripe July 30.—*Sam. Miller, Bluffton. Mo.*

Foliage much inclined to mildew in unfavorable seasons, more so even than others of the hybrids. *Fruit* much inclined to rot; consequently not recommended where these diseases prevail.

Adelaide. One of Jas. H. Rickett's new grapes; a hybrid between Concord and Muscat Hamburg. It is described as of medium size; berry of oval shape, black, with light blue bloom; of a sweet but sprightly flavor; purpled red flesh.

Alexander. Syns.: Cape, Black Cape, Schuylkill Muscadell, Constantia, Springmill-Constantia, Clifton's Constantia, Tasker's Grape, Vevay, Winne, Rothrock of Prince, York Lisbon. (*Labr.*) This grape was first discovered by Alexander, gardener to Gov. Penn, on the banks of the Schuylkill, near Philadelphia, before the war of the revolution. It is not unfrequently found, as a seedling from the wild Fox Grape, on the borders of our woods. American grape culture proper began with the planting of this variety, at the beginning of our century, by a Swiss colony, at Vevay, in Switzerland Co., Indiana, on the Ohio River, 45 miles below Cincinnati. It was for some time supposed to be the famous grape of the Constancia colony, on the Cape of Good Hope.

Whether John James Dufour, the respected leader of that Swiss colony, shared that error, or whether he deemed it necessary to leave them in this error—while he had the sagacity to discover that their former failures (in Jessamine Co., Ky., 1790–1801) were caused by planting *foreign* grape-vines, and intentionally substituted a native variety—we do not know; certain it is that this was the first successful attempt to establish vine-yards in our country. A very good wine, resembling claret, was made from the *Cape*, and it was the favorite of former days until displaced by the Catawba. (The *White Cape* is similar to the above, differing only in its color, which is greenish-white.) *Downing* describes it as follows: "*Bunches* rather compact, not shouldered; *berries* of medium size, oval; skin thick, quite black; flesh with a very firm pulp, but juicy; makes a very fair wine, but is quite too pulpy and coarse for table use, though quite sweet and musky when fully ripe, which is not till the last of October. Leaves much more *downy* than those of the Isabella."

W. R. Prince, in his Treatise on the Vine (N. Y., 1830), enumerates eighty-eight varieties of American grapes, but "for profit can only recommend the Catawba and the Cape; one-tenth of the latter variety would be enough. Of the two recommended above, the Catawba is much the most productive, but the *Cape is less subject to rot*. Both make good wines."

Aletha. (*Labr.*) A seedling of Catawba, originated at Ottawa, Ill.; said to ripen ten days in advance of Hartford Prolific. "*Bunches* medium size, stem long; *berries* hanging rather loosely; skin thick, color dark purple; juice nearly black, staining the hands and mouth. Flesh quite pulpy, with a decided foxy aroma; in foxiness and astringency it is much the same as a well ripened Isabella." Said to promise well as a wine grape for northern localities. Not disseminated, which is not to be regretted, judging from the above desription.

Albino. Syn: Garber's Albino (*Labr.*) Raised by J. B. Garber, Columbia, Pa., (supposed to be a seedling of Isabella). *Bunch* small; *berry* nearly round, slightly oval; yellowish or amber color. Flesh acid·tough; too late for the north.—*Chas. Downing.*

Allen's Hybrid. Raised by John Fisk Allen, Salem, Mass.; a cross between the *Golden Chasselas* and the *Isabella;* the *first* of American hybrid grapes, exhibited Sept. 9, 1854, at the Massachusetts Horticultural Society meeting. Ripens early, about with the Concord. *Bunches* large and long, moderately compact; *berries* full medium to large; skin thin, semi-transparent; color nearly white, tinged with amber; flesh tender and delicate, without pulp, juicy and delicious; has a mild, muscat flavor; quality best. The leaves have a peculiar appearance, and partly foreign character It is apt to mildew and rot, and can not be recommended for general culture, though it is worthy a place in amateur collections. From a union of Allen's Hybrid with Concord, the *Lady Washington* was produced.

Alvey. Syn: Hagar (*Hybr.*) Introduced by Dr. Harvey, of Hagerstown, Md. Generally classed with *Æst.*, but its characteristics point to a different species. Its erect growth, soft and short jointed wood, rooting very easily from cuttings; the exquisite quality, pure vinous flavor—all point to the *Vinifera*, and force us to the conclusion that *Alvey* originated from an intermixture of Vinifera and Æstivalis, crossed by natural hybridization. *Bunches* medium, loose, shouldered; *berries* small, round, black; sweet, juicy and vinous, without pulp; a slow grower, making a stout short-jointed wood; moderately productive; *roots* medium thick, more inclined to the wiry character of the Æstivalis class, with a medium smooth liber. Canes remarkably straight and upright, gradually tapering, and not inclined to ramble like most American varieties. Tendrils short and thin, often three-forked; buds covered with slight hairy down; the dark, medium sized foliage has also a slightly downy, whitish lower face; the tender young leaflets are very thin and almost transparent. Laterals few and feeble; wood rather soft, with large pith and coarse bark. These characteristics, together with its thin skin and total absence of pulp, strongly indicate a foreign character. Excellent in quality, but apt to drop its leaves on southern slopes; it makes a fine red wine, but too little of it, as it sets its fruit badly; seems to prefer the deep rich, *sandy* loam of our northeastern or even northern slopes. Reports generally unfavorable.

AGAWAM. (Rogers' No. 15.)

Agawam. (Rogers' Hybrid No. 15.) Raised by E. S. Rogers, of Salem, Mass., and considered by him as his best variety before the introduction of the Salem. It is a brownish-red or maroon grape, of the Hamburg cross; *bunches* medium to large, compact, often shouldered; *berries* very large, somewhat globular; skin thick; pulp soft; sweet, sprightly, of peculiarly aromatic flavor and a little of the native aroma; productive, and of great vigor of growth; prefers long pruning ("let the branches run as far as they will go"—*Rev. R. Burnet, of Ontario*); *roots* stout, fleshy and moderately fibrous, with a thick, smooth liber. Canes very stout, moderately long, with comparatively few but strong laterals. Wood rather long-jointed, of average hardness and medium sized pith. Buds large and prominent. Ripens soon after the Concord. Reports generally satisfactory; succeeds well. In many localities it is inclined to mildew and rot, in others a decided success.

AMBER.

Alma. (*Riparia-Hybr.*) A seedling of the Bacchus fertilized with a hybrid seedling from a cross between a hardy native variety and the "Purple Constantia," from the Cape of Good Hope(?), produced by JAS. H. RICKETTS, who says, in presenting this new seedling grape: "I feel confident that it will meet the approval of the grape and wine-growers of America, as it is a pleasant dessert grape, and makes a splendid wine, with a rose and wintergreen flavor most delicately blended. This variety is a fine healthy grower; foliage large, lobed, slightly tomentose on the under side; perfectly hardy and has never shown the least trace of disease. The must has stood by the scale 100–107; acid, 5–7." Ripens with or soon after the Hartford Prolific. *Bunch* medium, compact, seldom shouldered; *berry* medium, black with blue bloom; spicy and very sweet. Vine vigorous and healthy. How this will do in other sections and soils remains to be proved; at Rickett's place it does well and is very fine.

Amanda. (*Labr.*) Description in our former edition, copied from Catalogue of Bluffton Wine Co. (and Hort. Annual, 1868) totally differs from the fruit which we obtained from plants of same source. "It is a *large* black, thick-skinned, hard-pulped grape; in taste and aroma somewhat similar to Ives and Rentz; the *bunch* is of medium size, compact, quite showy; the vine a most vigorous, healthy Labrusca. Esteemed for red wine by some;—may be the same as "August Pioneer."

Amber (*Riparia* ×). A sister of the Elvira, raised by Jacob Rommel, of Missouri, seems to be a cross between Riparia and Labrusca, having some characteristics of both species. Vine hardy, vigorous and moderately productive; Rommel says it should be fruited on spurs from old wood; a rather long-jointed strong grower; dark brown wood, with large foliage, some-what downy beneath. *Bunches* long, shouldered, moderately compact; *berry* medium, oblong, pale amber when ripe, skin thin; pulp tender; sweet, juicy and of fine flavor. Ripens later than Concord, and somewhat earlier than Catawba. A table grape combining good quality with attractive appearance, but too tender for shipping to distant markets; may also make a very good white wine. It seems, however, not to hold its leaves as firmly as other Taylor Seedlings.

Amber Queen (*Hybr.*). Described in Ellwanger & Barry's catalogue (by the originator) as follows: "Bunch large, shouldered like the Hamburg; berry large, frequently oblong; holds persistently to the bunch; amber colored at first, but grows darker till it becomes a purple grape; flesh tender, rich, and seeds small; plant a strong grower, with thick leaves, somewhat downy on the under side. Fruit always eatable in August, and with proper care will keep all winter." (We have never seen this grape. B. & S. & M.)

Aminia. (Supposed Rogers' No. 39.) In Fall of 1867 we tried to get those of Rogers' unnamed hybrids, which we had not yet tested, and aware of the confusion existing as to their numbers, we obtained a few of each number from different sources at the same time. Of those which we planted as No. 39 three survived, but not two of them were alike. One of them proved especially valuable. To ascertain whether this was the true No. 39 we addressed Mr. Rogers, to let us have a plant or a graft of the original No. 39, but were informed that the original stock was lost!

One of our vines No. 39 proved so valuable, that we determined to propagate it, and planted fifty vines thereof, while we destroyed the other two. From the commendation given to No. 39 at the quarter-centennial session of the Am. Pomol. Society, by its president, the Hon. M. P. Wilder, we have the more reason to suppose that ours is the true No. 39; but to avoid confusion with others which may be sent out by other propagators, under this number, and which may or may not be the same, we gave ours the name Aminia; Mr. Rogers as-

senting thereto. *Bunches* medium, slightly shouldered, moderately compact, more even, and better on an average than Rogers' grapes generally make; *berries* full medium to large, dark purple, nearly black, with a fine bloom. Flesh melting, with but little pulp, sweet and of fine flavor, ripening very early, about with the Hartford Prolific. We consider it one of our *earliest good* grapes. Vine moderately vigorous, quite hardy, productive, but fruit inclined to rot. Deserves to be extensively cultivated as a table grape in rot-free localities.

Anna. Seedling of Catawba, raised by Eli Hasbrouck, Newburgh, N. Y., in 1852. G. W. Campbell, of Delaware, Ohio, describes it as very hardy and healthy and of a moderate growth. *Bunches* rather loose, of medium size; *berries* medium; color light amber, with small dark specks, covered with thin, white bloom. Rather pulpy. Ripens with the Catawba. Not worth planting *here;* unhealthy and feeble.

Antoinette (*Labr.*), one of Miner's seedlings. A handsome, large white grape of the Concord character, with long, moderately compact bunches; a strong growing, healthy vine, and very productive; ripens earlier than Concord; flavor sweet, rich, with little pulp, few seeds, and but little of the foxy aroma. May prove valuable as a good early white grape.

Ariadne (or *Areadine*, incorrectly spelled.) (*Riparia.*) One of Ricketts' Clinton Seedlings, promising for red wine; *vine* vigorous and healthy, immensly productive, much inclined to overbear; *bunch* compact, resembling Clinton, but much better in quality; very juicy, sweet; producing a light red, heavy wine of fine flavor. These notes, taken at J. H. Ricketts' Experimental Grounds several years ago, are somewhat modified by his List of March, 1882, wherein he describes it as a Seedling of Clinton and a Newburgh Vinifera; the wood short-jointed and only moderately vigorous; *foliage* medium, coarsely serrated; *bunch* small to medium, compact; *berry* small, round, black, with a light blue bloom; flesh soft, tender, juicy and sweet. It makes a very dark and rich wine, of good body, with the old Sherry flavor. Mr. Ricketts is quite confident that this grape will become popular for wine purposes, as soon as known.

Arnold's Hybrids.* See Othello (No. 1.) Cornucopia (No. 2.) Autuchon (No. 5.) Brant (No. 8.) Canada (No. 16.)

Arrot (or Arcott?) (*Labr.*) Philadelphia; *bunch* and *berries* medium, white; resembling the *Cassady* in appearance, but not as good. "Sweet and good, with a thick skin, good grower, and productive."—*Husmann.*

* Charles Arnold, of Paris, Canada, has been successful in his experiments in hybridizing the native Clinton with the pollen of foreign varieties. His seedlings seem to be of decided promise in some localities. The Committee of the Paris Horticultural Society say in their report: "We find the most prominent characteristics of them as a class are: first, perfect hardiness and vigorous growth; second, early ripening both of the fruit and wood, and as yet remarkable freedom from disease, with large, handsome foliage of a very distinct character and not wooly; *bunches* large on the average; the *berries* larger than medium; skin thin, and in all the numbers we tested, free from pulp, with a full, pleasant, sprightly flavor; our judgment being based not on a cursory examination, but from having known them for the last two seasons."

AUTUCHON.

Autuchon. (Arnold's Hybrid No. 5.) A seedling of Clinton, crossed with Golden Chasselas. Leaves dark green, very deep lobed and sharp pointed serratures; the unripe wood is very dark purple, nearly black. *Bunches* very long, not heavily shouldered, rather loose; *berries* medium size, round, white (green), with a moderately firm, but readily melting flesh, and an agreeable, sprightly flavor, resembling the White Chasselas. Skin thin, without astringency. Ripens with the Delaware. Sam. Miller, the originator of the Martha, bestowed the following high encomium upon the new grape in 1869:

"I have always considered Martha the best white native grape, but since seeing and tasting the Autuchon, I haul down my colors. *If* it will ripen like this in Canada, and *if* it improves by coming here like Rogers' and other Northern grapes, then it seems to me we have all that can be desired. It alone is a treasure."

It is well that friend Miller qualified his encomiums by "ifs," for the Autuchon did not come up to those expectations; it proved tender and unreliable, in the

West at least; its fruit subject to rot and mildew, and notwithstanding its fine qualities, it will remain but an amateur variety and cannot be recommended for profitable culture in vineyards.

We append an illustration which gives a truthful view of the bunch as grown with us, for we have never seen any so large as represented by the cut used in our first edition, and which was obtained from the originator. In localities and soils favorable to this variety it may, however, attain more than twice the size of the bunch here figured.

Aughwick. (*Rip.*) Introduced by Wm. A. Fraker, Shirleysburg, Pa. *Bunches* shouldered, similar to Clinton; *berries* larger than Clinton, black, juice very dark, of spicy flavor; said to make a very dark red wine, of superior quality, and to be entirely free from rot or mildew; very hardy and healthy. We found it *not* as good as Clinton, and less productive. Should be discarded.

August Giant (Hybr.) A cross between Black Hamburg and Marion, owned by Geo. A. Stone's estate, and described as follows: *bunches* very large with rather long and very strong stem; when shouldered the shoulders are very short and double; *berries* very large, somewhat oblong, often measuring 1⅛ inch in diameter. Placed in a basket beside Black Hamburg, the August Giant can hardly be distinguished from it. Fruit when well grown has a decided Hamburg flavor; quite tender to the centre, very rich and fine; leaf strong and thick, and vine an enormous grower and bearer. Fruit ripe in August; vine perfectly hardy.

August Pioneer. (*Labr.*) Origin unknown; one of the coarsest of native sorts; large, black, with a firm, hard, pulpy flesh; fit only for stewing. Middle of August.—*Downing.*

Baldwin Lenoir. (*Æst.*) Originated at West Chester, Pa.; said to be a seedling of the Lenoir; *bunch* small, rather loose; *berries* small, quite dark, almost black; flesh somewhat rough, acid, brisk. Reported the richest in grape-sugar of twenty-six varieties tested by the chemist of the Agr. Department at Washington. In foliage and habit of growth, it is much like Lincoln. Bunch and berry similar to Norton's, but less harsh and sweeter, when well ripened; valuable for red wine.

Barnes'. (*Labr.*) Originated with Parker Barnes, Boston, Mass. *Bunches* shouldered; *berries* medium, oval, black, sweet and good; nearly as early as Hartford.—*Strong.* We have not seen the grape.

Bacchus. (*Riparia.*) A Seedling of the Clinton, produced by James H. Ricketts, of Newburgh, N. Y. Resembles the parent in leaf, bunch and berry, but is superior to it in quality and productiveness. *Bunch* medium, compact, shouldered; *berry* round, below medium, black with blue bloom, juicy and sprightly. Ricketts says: "With me it has stood all possible tests for the last fourteen years, as to hardiness of wood, leaf and fruit. Its roots also have proved Phylloxera proof and reliable in every particular. Wherever tested, all agree in ascribing to it the peculiar qualities necessary in a perfect wine grape." The Bacchus makes a dark brownish-red wine of great body. Must registered 95° to 110° for a number of years. Some regard the Bacchus, as a wine-grape, with greater favor than any of Ricketts' many other valuable seedlings; it grows well, and is free from mildew, even in most unfavorable seasons.

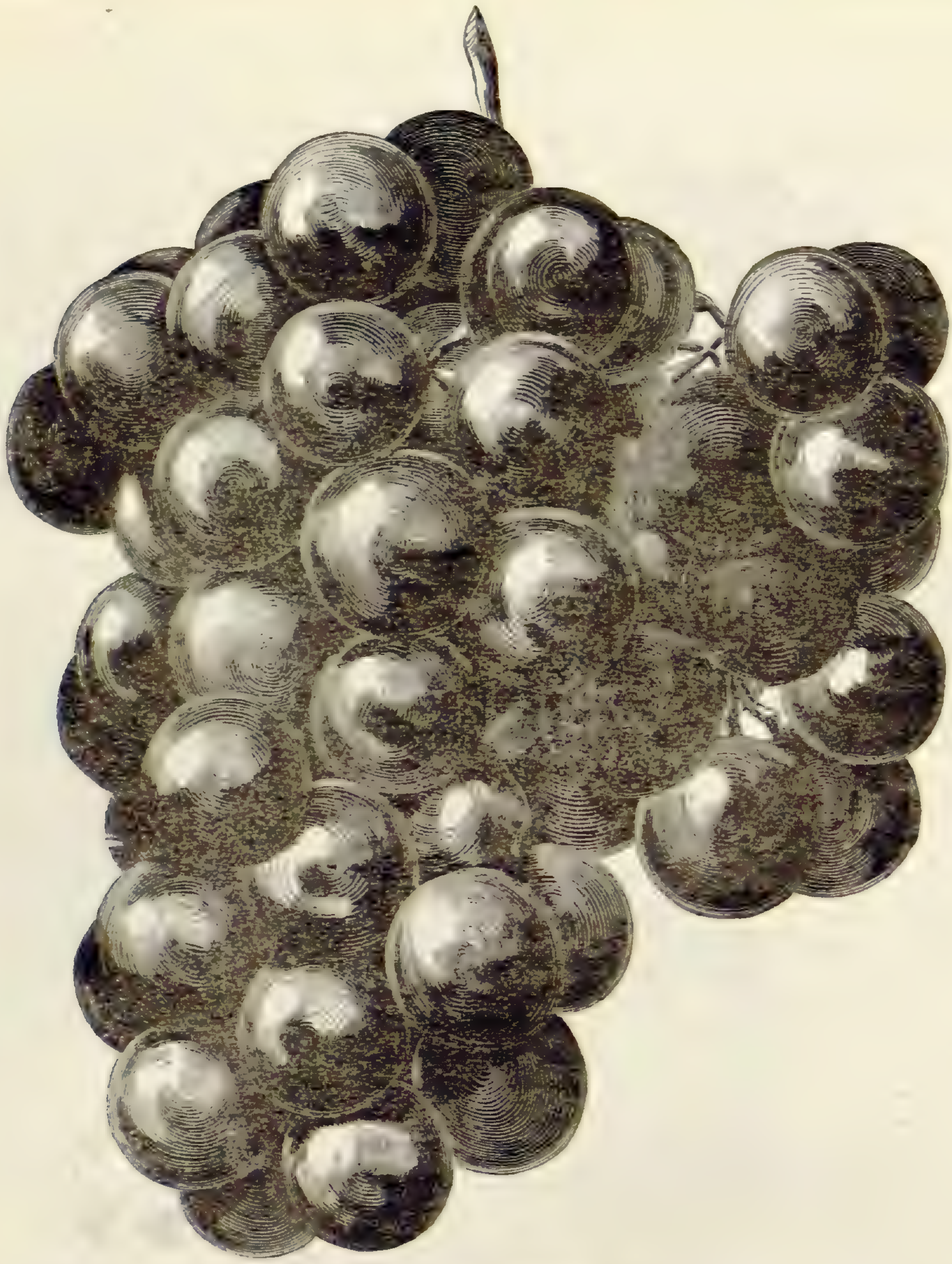
The annexed cut of the Bacchus, specially engraved for our Catalogue, shows this grape, reduced to nearly one-half its natural size.

Beauty. (*Labr.* ×) One of Jacob Rommel's Seedlings; a cross between Delaware and Maxatawney; a vigorous healthy grower; foliage heavy and healthy, yet subject to sunscald; resembling Catawba (and we suppose it to be a cross between *Catawba* and Maxatawney rather, than between *Delaware* and Maxatawney); *bunch* small to medium, well filled, but not too compact; *berry* in size and color between Catawba and Delaware, oblong, covered with lilac bloom; thick skinned, and will carry well; ripens between Delaware and Catawba, and is of very fine quality, having tender pulp, sweet, with delicate flavor. A promising market and table grape, making also an excellent wine. In fact a sample of "Beauty" wine, at the Bordeaux Exposition, in September, 1880, was pronounced by the French Commissioners "*the best* American white-wine on exhibition; having a very marked and agreeable bouquet." *M. Lespiault.* Its parentage, however, justifies the fear that it may be subject to mildew in seasons and localities not exempt from this disease; it is also inclined to rot in wet seasons.

Belvidere. (*Labr.*) Originated by Dr. Lake, of Belvidere, Ill. Was expected to be a valuable market variety, on account of extreme earliness; large size and fine appearance. In some localities was claimed to be an improvement in bunch and berry upon Hartford Prolific, but in quality is not much, if any better; like Hartford, it shows a tendency to fall from the bunch, especially if a little over-ripe. Being in appearance much like Hartford Prolific, only not as large, a description is unnecessary. It is a vine of very vigorous growth, perfectly hardy and healthy, very early and productive; but so is the Hartford also, and, we think, we have more than enough in *one* variety of such poor quality.

Berks, or Lehigh. (*Labr.*) *Bunch* large, shouldered, compact; *berry* large, round, red, little pulp, good quality; *vine* vigorous grower, similar to Catawba, of which it is a seedling, and perhaps an improvement in size and quality; but also more subject to disease.

"BACCHUS"
Bushberg Nurseries
Albany, Illinois



BARRY. (Rogers' No. 43.)

Barry. (Rogers' No. 43.) **One of the most attractive of Rogers' Hybrids, "as handsome as the *Black Hamburg*." *Bunch* large, rather broad and compact, short; often larger than represented on the annexed engraving; *berry* large, roundish; color black; flesh tender, of a sweet, pleasant flavor; skin thin, somewhat astringent. Vine as vigorous, healthy and hardy as any one of Rogers' Hybrids. Very successful in western New York and some other localities. Very productive and early, earlier than the Concord, and keeps remarkably well. In this respect as well as in quality the Rogers' Hybrids possess a great advantage over the Concord.**

Baxter. (*Æst.*) *Bunch* large and long; *berry* below medium, black; very late in ripening, hardy and productive; not fit for table, but may be valuable for wine.—*Bluffton Wine Co.'s Catalogue.*

Beauty of Minnesota. (*Labr* ×) Originated (or introduced only) by J. C. Kramer, of La Crescent, Minn. Described by him as a Seedling of Delaware crossed with Concord; a good grower and healthy; *bunch* equal to Concord, but more compact; *berry* greenish yellow when ripe and of rich flavor; recommended by him, and endorsed by many testimonials as the best grape for the climate of Minnesota, ripening there by the 1st of September. Not sufficiently tried elsewhere.

Bird's Egg. (Labr.) Probably a seedling of Catawba, somewhat similar to *Anna*. *Bunch* long, pointed; *berry* oval, whitish, with brown specks; flesh pulpy; only good; a curiosity.—*Downing.*

Black July. See *Devereaux.*

Berckmans. A cross between *Clinton* and *Delaware*, originated by the late Dr. A. P. Wylie, Chester, S. C. Vine very vigorous and prolific; growth and foliage almost similar to *Clinton*. Bunches and berries larger than Delaware, of same color and quite equal in quality to this favorite variety. We were growing it under restrictions, not to propagate nor to sell or give any wood of same. It proved healthier, freer from mildew, than Delaware, and deserves dissemination. We are happy to learn that P. J. Berkmans, in whose honor it was named, has propagated it, and vines are now growing and fruiting in several localities North and South, fully sustaining our good opinion of it.

Black Defiance. (Underhill's 8-8 Hybr.) A splendid, late table grape, about the best black table grape we have, with us more desirable than *Senasqua*. If we are rightly informed, it is a cross between Black St. Peters and Concord. *Bunch* and *berries* large, black, with a fine bloom; three weeks later than Concord, and much better in quality. Succeeds well, and pleases also in France.

Black Eagle. (Underhill's 8-12.) A Hybrid of Labr. and Vinifera. A fine, early table grape, of best quality. The leaf is one of the most beautiful we know of, very firm, dark green, deeply lobed, of the shape of the foreign.

The vine is of very erect and vigorous growth, hardy and healthy, yet subject to rot, as all other Hybrids of Labr. and Vin., in unfavorable seasons and localities; *roots* straight and smooth, almost tough, with a medium liber; canes remarkably straight and upright, with numerous, but small laterals; wood firm with medium pith; *bunch* large, moderately compact; *berries* large, oval, black, with blue bloom; flesh rich and melting, with little pulp. With *Underhill* the fruit set imperfectly, but it does not always show that fault, and may have been due to unfavorable weather during its florescence at Croton Point. We consider it one of the most promising varieties. Campbell, of Delaware, considers it as "among the best of the hybrid varieties." Berckmans, of Georgia, Chairman of Fruit Committee, said: "*Black Eagle* we find to be unsurpassed in quality, productiveness and vigor. I have seen bunches that weighed a pound and three-quarters, grown at Macon, Georgia, three years ago."

We give on the following page a full size figure of its bunch and leaf (the ribs of the latter incorrectly drawn, as usual).

Black Hawk. A seedling from the Concord, raised by Samuel Miller. *Bunch* large, rather loose; *berry* large, black, round, juicy, sweet; pulp very tender; ripens full as early as the Concord, and seems to be healthy and hardy. We find it sometimes a little earlier than Concord. It has the remarkable peculiarity that its leaf is of so dark a green as to appear almost black.

Black King. (*Labr.*) A hardy and vigorous early grape, of medium size; sweet but foxy.—*Strong.*

Black Pearl. (*Riparia.*) Syn. SCHRAIDT'S SEEDLING. Originator, Caspar Schraidt, of Put-in-Bay, O. Probably from seed of Clinton or Taylor. *Vine* a vigorous, healthy grower, similar in appearance of growth and foliage to Elvira and Noah. It succeeds admirably on the islands and shores of Lake Erie, where it is very productive. In our heavier clay soils and warmer climate it is less satisfactory both in quality and productiveness; the bunch is not as large and handsome as on the islands and on the lake shore, where it far surpasses the Clinton in appearance, and makes a *valuable* DARK-RED *wine*.

Dr. Warder considered it "an exceedingly promising grape, of the *Clinton* class." (Am. Pom. S. 1877.) So did we also consider it, after examining it for several seasons in Schraidt's vineyard; and after transplanting a few vines, obtained from him, into our Bushberg vineyard, and admiring its luxurious, healthy growth there, we secured from Mr. Schraidt a thousand cuttings, and disseminated this new variety, in 1877, with his consent, under the name of Black Pearl. (He first intended to call it "*Burgundy*" or "*Schraidt's* Burgundy," and claimed it to be a seedling from the Delaware.) Geo. W. Campbell, of Ohio, who is good authority and had opportunities to observe this grape in his own State, says: "It is a strong growing and very productive vine, and is probably a valuable addition to the quite limited number of red-wine grapes." And as such only we recommend it *for certain localities.*

In August, 1882, a season of unparalled destruction through mildew and rot in the Mississippi Valley region, E. Baxter, of Nauvoo, reports the Black Pearl grape as exceptionably fine, leaf extra good.—A. Wehrle, of Middle Bass, the leading wine producer of Ohio, wrote to us last fall that he finds this wine grape unsurpassed in color; *must* of good saccharine weight and proper degree of acidity; but adds: "It suffers with us sometimes during the flowering season, otherwise it is a most valuable grape, and pays well to the producer."

Black Taylor. (*Riparia* × or Rommels No. 19.) In many respects similar to his No. 14, or MONTEFIORE, has not been sufficiently tried, and should not be disseminated unless it should prove sufficiently distinct or superior to this valuable novelty.

BLACK EAGLE. (Underhill's 8-12.)

Bland. (*Labr.?*) Syn. BLAND'S VIRGINIA, BLAND'S MADEIRA, BLAND'S PALE RED, POWELL. It is said to have been found on the eastern shore of Virginia, by Col. Bland, of that State, who presented scions to Bartram, the botanist, by whom it was first cultivated. *Bunches* rather long, loose, and often with small, imperfect berries; *berries* round, on long stalks, hanging rather thinly; skin thin, at first pale green, but pale red when ripe; flesh slightly pulpy, of a pleasant, sprightly, delicate flavor, and with little or no musk scent, but a slight astringency; ripens late; foliage lighter green than that of Catawba, smoother and more delicate. This vine is quite difficult of propagation by cuttings. The above description of this old variety is from "*Downing's* Fruits of America." The Bland did not succeed or ripen well in the North, and has been lost and abandoned South.

Blood's Black. (*Labr.*) *Bunch* medium, compact; *berry* medium, round, black, somewhat harsh and foxy, but sweet. Very early and productive. (Resembling *Mary Ann*, and has often been confounded with it.

Blue Dyer. (*Rip.*) *Bunch* medium; *berries* small, black, very dark juice, promises well for wine.—*Husmann.* (One of many unfulfilled promises!)

Blue Favorite. (*Æst.*) A Southern grape. Vine vigorous, productive; *bunch* above medium; *berries* medium, round, blue-black, sweet, vinous; much coloring matter; ripe South in September (does not ripen well North); said to be esteemed for wine making. —*Downing.*

Blue Imperial. (*Labr.*) Origin uncertain. Vine vigorous, free from mildew, *not* productive. *Bunches* medium, short; *berry* large, round, black; flesh with a hard acid centre or pulp; ripens with Hartford. Inferior.—*Downing.*

Brant. (Arnold's Hybrid No. 8.) Seedling of Clinton crossed with Black St. Peters. The young leaves and shoots dark blood-red; leaves very deeply lobed, smooth on both sides. *Bunch* and *berry* resembling the *Clinton* in appearance, but greatly superior in flavor when perfectly ripe; skin thin, free from pulp, all juice, sweet and vinous; seeds small and few; perfectly hardy; *vine* a strong, healthy grower and sufficiently productive. The bunch hangs firmly to the vine till fall, and the berries adhere well to the bunch. Our illustration of this variety is from a specimen of average size and shape. A very early and desirable grape, in fact *the earliest of all* with us, and it would be the most profitable if the birds would not destroy the bunches as soon as they ripen. For localities where grapes ripen later than with us, and where birds are less destructive, it is worthy of the attention of grape-growers.

Our friend Champin gives us a very favorable report of this variety in Northern France (Drôme), where the Brant and its sister the Canada deserve to be cultivated extensively. They resist so far the Phylloxera, although one of their parents is undoubtedly of the Vinifera class, and during the six years that he cultivated them they have increased from year to year in vigor and fruitfulness. These two varieties have often been confounded with each other, and the following may serve to distin-

BRANT.

guish them: The Brant has the most sinuous, deeply-cut and indented-lobed foliage of any American variety, while that of the Canada is mostly but little indented and lobed, while

BRIGHTON.

young. But the form of leaves is very variable, and no reliable distinctive character can be made of them; a more reliable characteristic is their color: that of the Brant is of a deeper green with a reddish tinge, while that of the Canada is a lighter green with a whitish tinge; and so are the tendrils of the latter of a paler green and only two-forked, while those of the Brant are darker, longer, and often doubly bi-forked. The Brant has long-jointed red-wood; the Canada's wood is rather short jointed, of less vigorous growth, green, brownish towards the sun. The bunches of the Canada are usually shorter and more compact; those of the Brant are not loose either, but not so very compact as to flatten the berries. The seeds of the Brant are very small, and rarely more than two in a berry. Both ripen very early, and give a wine of excellent quality and of very handsome red color.

Brighton. (*Labr.* ×). This handsome and fine grape, raised by Jacob Moore, of Brighton, N. York, is a cross of the Concord and Diana-Hamburg. Vine hardy, a rapid and vigorous grower, with medium to long-jointed shoots, which ripen early; *leaves* large, thick, dark

green, glossy, coarsely serrated, occasio lobed. Very productive, and, if the small bunches were taken off early in the season, it would be a great benefit to the others.

"*Bunch* medium to large, shouldered, moderately compact; *berries* medium to large, round, light red at first, changing to a dark crimson or maroon when fully matured, sometimes almost black, and covered with a thick lilac bloom. The berries adhere well to the peduncle; skin thin but tough; flesh tender, very slight pulp, sweet, juicy, slightly aromatic, very slightly vinous, and of very good quality for an early grape. It has its best flavor when it is first ripe, but becomes pasty and loses its sprightly flavor when fully ripe. Ripens nearly as early as the Hartford Prolific and before the Delaware."—*A. J. Downing.*

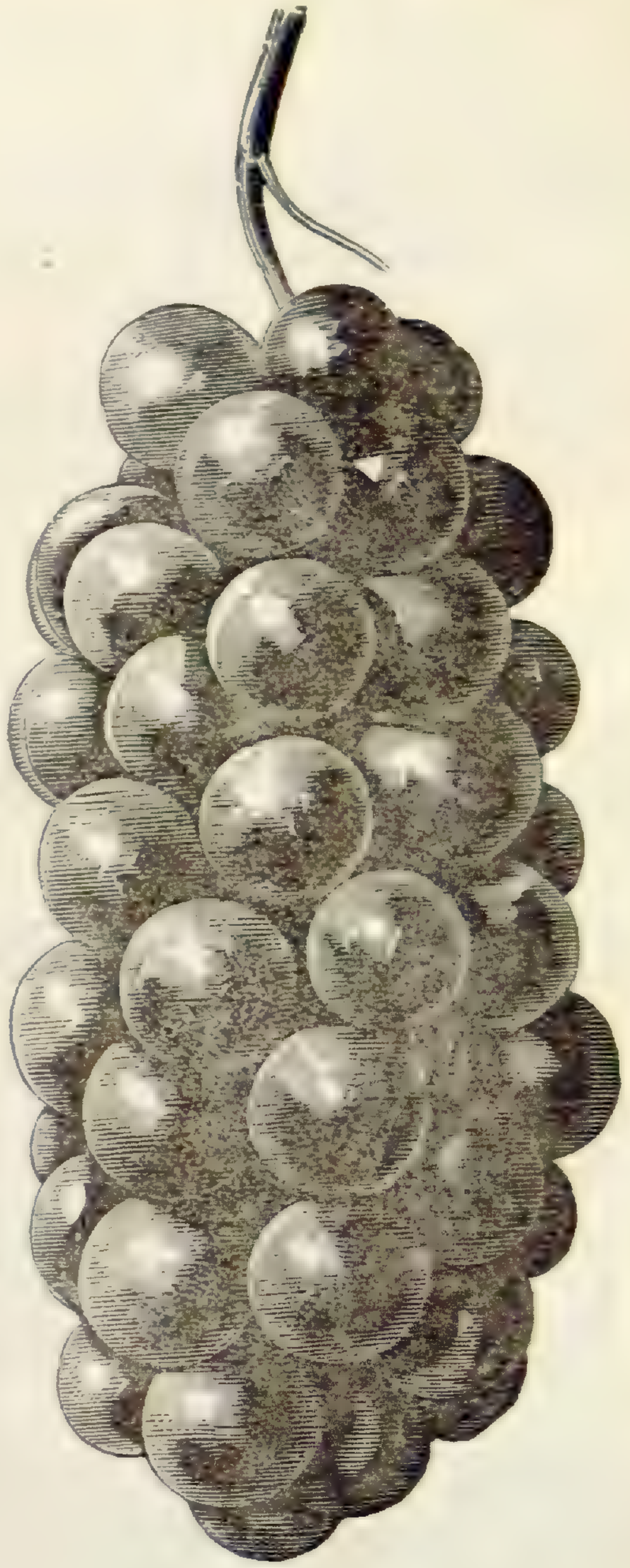
One of the most promising and successful new varieties, largely cultivated in the Eastern States, where it is NOW THE LEADING TABLE GRAPE. It is worthy of extensive planting wherever any of the hybrid grapes can be grown successfully and *early grapes* for table or market are desired; requires protection in severe winters. The cut is a faithful copy of a photograph from a medium size bunch of the Brighton grape. In general beautiful appearance the Brighton closely resembles the Catawba, which ripens a month later.

Bottsi. (*Æst.*) The local name for a very remarkable grape, grown in the garden of a gentleman of that name, in Natchez, Miss. It is said to throw all other grapes ever grown there (including the Jacquez) completely in the background, and is claimed to be the true Herbemont brought some fifty years ago from South Carolina. It differs from our Herbemont in color, being of a light pink in the shade, a dark pink in the full sun. The impartial, trustworthy testimony of H. Y. Child, an amateur horticulturist, as to its excellent quality and rapid growth, enormous fruitfulness and freedom from rot, made us procure and plant some wood of this variety. — After several years' testing we found it unsuited to our locality, too tender and liable to mildew. In Texas it is found "a splendid thing," but, as Mr. Onderdonk assures us, "just like the Herbemont."

Burnet. (Hybr.) The Burnet grape, raised by P. C. Dempsey, of Albany, Prince Edwards Co., Ont., from seed of the Hartford Prolific, fertilized by Black Hamburg. The vine is vigorous and healthy, hardy and productive; leaves deeply lobed, thick, downy beneath; *bunches* large, well shouldered and well filled; the *berries* large, oval, purplish-*black*; flesh and flavor resembling Black Hamburg, without any trace of foxiness; ripening earlier than Concord.—*Burnet.*

Burroughs'. (*Rip.*) From Vermont. Vine allied to the Clinton. *Bunch* small; *berry* round, black, thick bloom; flesh harsh, acid, austere.—*Downing.*

Burton's Early. (*Labr.*) A large, early, poor Fox grape Unworthy of culture.—*Downing.*



CANADA.

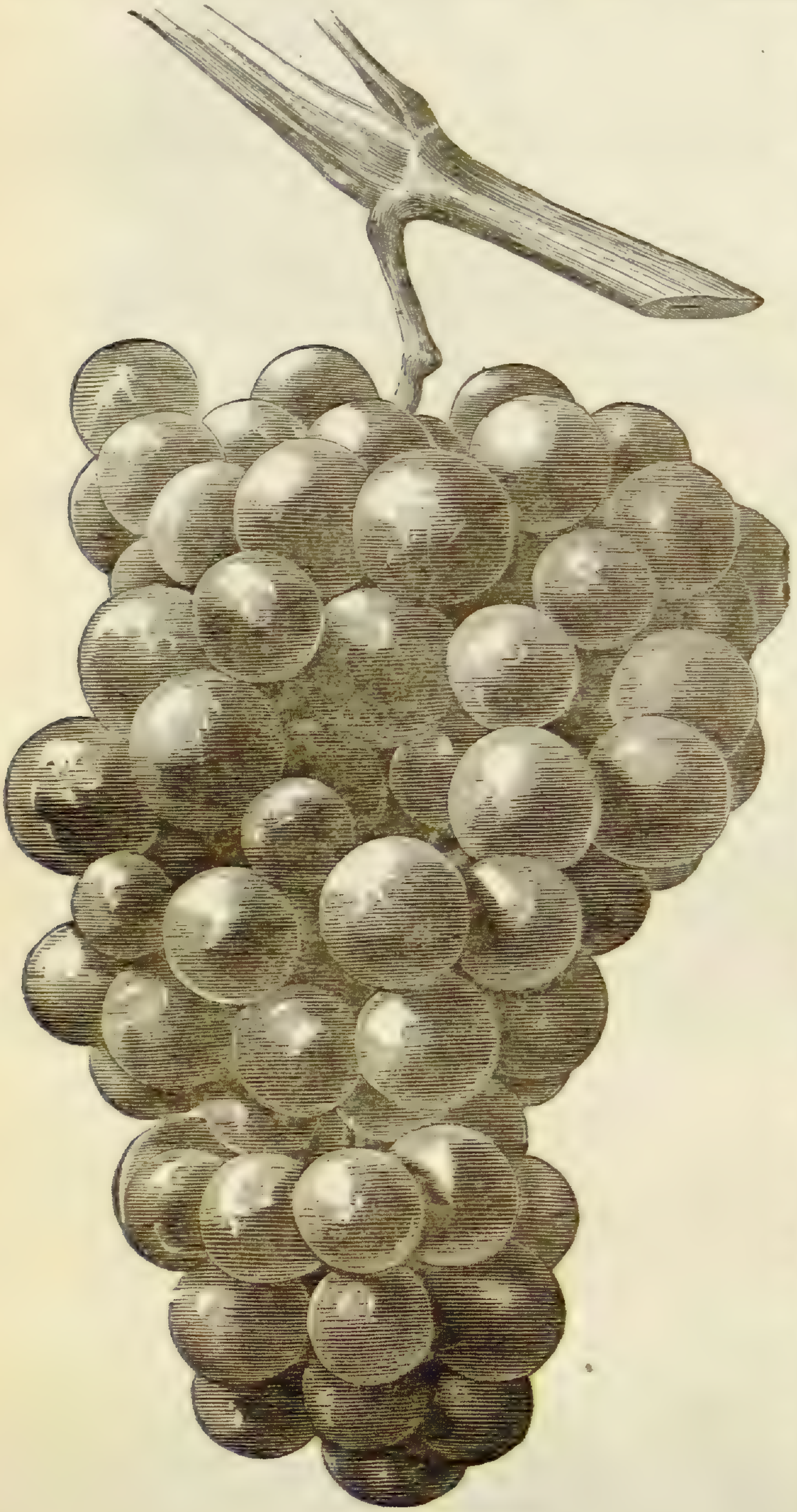
Canada. (Arnold's Hybrid No. 16.) Raised from seed of Clinton, crossed with pollen of Black St. Peters. Resembles the Brant (No. 3) in appearance. [For characteristic differences see Brant, p. 77.] It is justly praised for its rich aromatic flavor and delightful bouquet by all who taste it. *Bunch* and *berry* above medium; color black, with a fine bloom; skin thin, free from harshness and from the acidity common to other native grapes. A moderate grower, with peculiar foliage; hardy, and matures its wood well. Valuable for wine in some localities.

Like all of Arnold's Hybrids, it proves tender and unreliable in the United States, in most localities, while in France it is very successfully grown and proves Phylloxera-resisting. But this is not to be construed as a general and absolute condemnation for all parts of our country, nor as a recommendation for all

the different regions of viticulture in France. The Cornucopia and the Canada have perished at Nîmes, while they have been growing and succeeding finely during the last eight years in the valley of the Saône. The principle of adaptability to certain soils, aspects and localities, and not to others, applies to hybrids in a greater degree even than to varieties of our native species.

Cambridge. (*Labr.*) Originated in the garden of Francis Houghton, Cambridge, Mass., and introduced by Hovey & Co., of Boston, as "of the highest merit." They described it as follows: "It is a black grape, somewhat resembling Concord, but with more oval berries. *Bunches* large and shouldered; *berries* large, with a very thin skin, covered with a delicate bloom, and adhering firmly to the bunch; flesh rich, brisk, and refreshing; without pulp, and more nearly approaching the Adirondac in quality than any other native grape. Period of ripening a few days before the Concord. The vine has the luxuriance of growth and handsome foliage of the Concord, while it is quite as hardy, if not hardier, than that grape.

In some favorable seasons, as in 1880, the Cambridge produced in our vineyards much finer, larger bunches than the Concord; generally, however, it is nearly identical in taste and appearance with this popular variety.



CATAWBA.

Camden. (*Labr.*) *Bunch* medium; *berry* large, greenish-white; flesh with a hard centre; acid; poor.

Canby's August. See York Madeira.

Catawba. Syn.: RED MUNCY, CATAWBA, TOKAY, SINGLETON. (*Labr.*) This old and well-known variety is a native of North Carolina, and has its name from the Catawba river. It was transplanted to a garden at Clarksburg, Md., and introduced to notice sixty years ago by Major John Adlum, of Georgetown, D. C. It has been for many years the standard wine grape of the country, and thousands of acres have been planted with it; but owing to its uncertainty, on account of the mildew and blight, and its too late ripening in the Eastern and Northern States (in October), it is now discarded in many sections, and other reliable kinds are planted instead. In localities where it will fully mature, and where it seems less subject to disease, there are very few better varieties.

Contrary to the heretofore prevailing belief that the Phylloxera was the main cause of the failure of the Catawba in many sections, and contrary to the opinion of some eminent scientists who still hold this view, we have now come

to the conclusion, based upon careful observation, that the diseased and enfeebled roots of the Catawba are caused by the disturbed development of the mildewed tops, and *not* by the Phylloxera. Where mildew does not prevail, as on the islands of Lake Erie, on the lake shore, &c., the Catawba is still and will deservedly remain for years to come the leading variety for market and for wine.

The late Dr. Warder truly said, that the beautiful banks of the Ohio might again be covered with vineyards, if we could only discover a grape, equal in quality to the Catawba, that would not be subject to mildew or rot.*

Bunches large, moderately compact, shouldered; *berries* above medium, round, deep red, covered with lilac bloom. Skin moderately thick; flesh slightly pulpy, sweet, juicy, with a rich, vinous, and somewhat musky flavor. Vine a vigorous grower; in favorable seasons and localities very productive. Clay-shale soil, also gravelly or sandy soils seem best adapted. *Roots* light, in comparison to the naturally strong growth of the vine, when in a perfectly healthy state, with a texture below average hardness; thick liber, and not inclined to push young fibers as rapidly as other varieties; canes straight and long, with few laterals; wood of average hardness, with a pith a little more than the average size. *Must* ranges from 86° to 95° by Œchsle's scale.

The *Catawba* has quite a number of SEEDLINGS; of *Iona* and *Diana*, its two best, and of *Aletha*, *Anna*, *Hine*, *Mottled*, &c., we give descriptions in their alphabetic order; but some are actually the same as *Catawba*, and only pretended seedlings, to sell under a new name; others are so nearly identical as not to require description. To this class belong:

Fancher, claimed to be an early Catawba.

Keller's White; Mead's Seedling; Merceron.

Mammoth Catawba of Hermann, very large in bunch and berry, but otherwise inferior to the parent.

Omega, exhibited in 1867 at the Indiana State Fair.

Saratoga, the same as Fancher.

Tekomah, a Missouri seedling of *Catawba*.

White Catawba, raised by John E. Mottier, and abandoned by himself as being inferior to its parent.

Cassady. (*Labr.*) Originated in the yard of H. P. Cassady, Philadelphia, as a chance seedling. *Bunch* medium, very compact, sometimes shouldered; *berry* medium, round, pale green, covered with white bloom; when very ripe its color changes to light yellow; skin thick and leathery, pulpy, but with a peculiar honeyed sweetness which no other grape posseses in the same degree. Ripens with the Catawba. Vine a moderate grower; a true Labrusca in habit and foliage; immensely productive, so much so that nearly every fruit-bud will push out several branches, with from three to five bunches each. But after thus over-bearing it becomes exhausted for several seasons, the leaves drop prematurely, and the fruit will not ripen.

This grape is now generally discarded, being replaced by new and better varieties. It is said to be the parent of the "*Niagara*" grape.

The "Arrott" resembles the Cassady very much.

Catawissa. See *Creveling*.

Centennial.*—A promising *new* grape, raised by D. S. Marwin, Watertown, N. Y., by him supposed to belong to the northern type of Vitis Æstivalis (a seedling of the *Eumelan*, fertilized by pollen from some Labrusca grape, probably *Iona* or *Delaware*, certainly from NO foreign grape), and kindly sent to us for testing.

No plants of this variety were as yet offered for sale. (First figured in Rural New Yorker, 1882.)

Vine described as a vigorous grower, with heavy, durable foliage; very fertile, inclining to overbear; has sometimes mildew on its leaf, but no signs of rot in the berries. The *clusters* are large, of fine conical shape, always compact; the *berries* are above medium, round; *skin* firm, of a peculiar handsome *color*, almost white with a light pink shade; flesh juicy, very sweet, vinous, resembling the Delaware in flavor. It ripens about the same time with or a few days later than Concord and *keeps well for winter use.* The Centennial promises to be valuable both as a table grape and also for wine, its only apparent fault being that the seeds are rather large and numerous.

When first introducing the *Centennial* (in fall of 1882) Marwin said:

"I do not approve of multiplying varieties unless "they are improvements. During my many experi- "ments I have thrown away many seedlings superior to "many of our old sorts. * * * I do not claim that the Cen- "tennial is perfect, * * * but for a winter grape I deem it "superior to all others * * * The vine is about as vigorous "here as the Concord, and seems about as exempt "from mildew, suffering much less than the Delaware. "* * * The reproductive organs seem perfect, there "being no emasculated clusters, so the vines bear "heavy crops. * * * Persons who desire a higher "quality of fruit, will be gratified with the Centen- "nial; and *if, upon trial, it be found to succeed generally "as well as it does in Northern New York*, real progress "in grape culture will follow its introduction.

"The grape was awarded silver medals, certificates, "money-prizes, and favorable mention, at many "fairs. * * * At the end of the season I shall be "able to give further proofs, but I feel like protesting "against this kind of proofs. Each new grape should "stand upon its own merits and the character of the "introducer. Horticulturists should be exempted "from giving certificates as to fruits that, from the na- "ture of the circumstances, they know little about."

These remarks of the originator, so modest and unassuming, give us greater confidence than we usually have in new varieties, and we recommend the *Centen-*

* At the moment that we are reading the proof of this, we notice in the *Messager Agricole* (Aug., 1883), the following, which we translate:

Certain Remedy against the Mildew (*Peronospora*). Jean Gazotti, a modest Italian grape-grower, had the happy idea to sprinkle the foliage of mildew infected vines with a solution of soda (2 kilos of soda in one hectolitre of water = 4½ pounds dissolved in 26 gallons of water), and he had the good fortune to find, on the day after such treatment, that the filaments of the peronspora were consumed.

While we scarcely venture to hope that this will be a certain remedy, it is well worth trying. May the results be satisfactory!

* Not *Continental*, as it is erroneously named in the Am. Pomol. Society-Report on new fruits, 1881.

nial, with our best wishes for its success, for trial in localities where its parent, the Eumelan, does not suffer from mildew.

Challenge. Supposed cross between Concord and Royal Muscadine, grown by Rev. Asher Moore, N. Jersey. Very early and prolific; short compact *bunches*, shouldered; large, round *berries*, pale red, with flesh slightly pulpy; very sweet and juicy. Extra hardy wood and leaf. We consider it purely native, yet an excellent dessert and wine grape.

Champion. Syn.: EARLY CHAMPION, TALMAN'S SEEDLING, BEACONSFIELD. (*Labr.*) Ten years ago (1873) President Wilder asked, "Does anyone know anything about the Champion?" And the late Dr. Swasey of Louisiana then informed us that it was a new grape, extra early, and one of the best in cultivation (Am. Pom. Soc. 1873, page 66), just sent out for the first time by some New Orleans nurserymen. In our Catalogue, edition 1875, we gave the best description we could then obtain, and said, "We shall try to obtain this new, extraordinary grape for testing," &c. But while it was said that the Champion had originated in one of the city gardens of New Orleans, La., an accidental seedling, "where it has so magnificently flourished and borne its splendid fruit," and "evaded the notice of our grape-growers for a number of years," we found that this was not so; that R. J. Donnelly at Rochester, N. Y., and J. I. Stone at Charlotte, Monroe Co., N. Y., propagated and disseminated the "Early Champion," apparently the same grape, before 1873, and that under the name of TALMAN'S SEEDLING, or TALMAN, this identical variety had been grown for many years around Syracuse and other N. Y. localities. It has now been fully and largely tested, and, while it has actually proven *the earliest* market grape, and has been a very sure and profitable one to some growers, it is so poor in quality, that, the better known it is, the less saleable does it become; and it should be, and probably soon will be, discarded for better varieties. A few years ago it was shipped to Montreal and other Canada markets, commanding there high prices, and, as the vine was found to succeed well and to bear abundantly in the neighborhood of Montreal, young Donnelly, who was then manager of the Beaconsfield vineyards, planted there several thousand of his father's Champion vines, and caused them to be planted quite extensively in the vicinity. Thus it became known* as the *Beaconsfield grape*. It was decidedly a profitable grape, selling at high prices on account of its earliness, before other grapes could be had—and until people became more appreciative of *quality*.

The *Vine* is a strong grower, thrifty, and perfectly hardy, with healthy foliage, entirely free from mildew, and very productive. *Bunches* large, handsome, compact, and shouldered. *Berry* round, bluish-black, nearly as large as *Hartford Prolific*; skin thick, firm, and adhering well to the stem. Ripens nearly one week earlier than *Hartford*, but is as poor, if not poorer, in quality.

This grape does the best on a warm, sandy, not very fertile soil.

* Or was so named by the proprietors of that vineyard against Donnelly's protest.

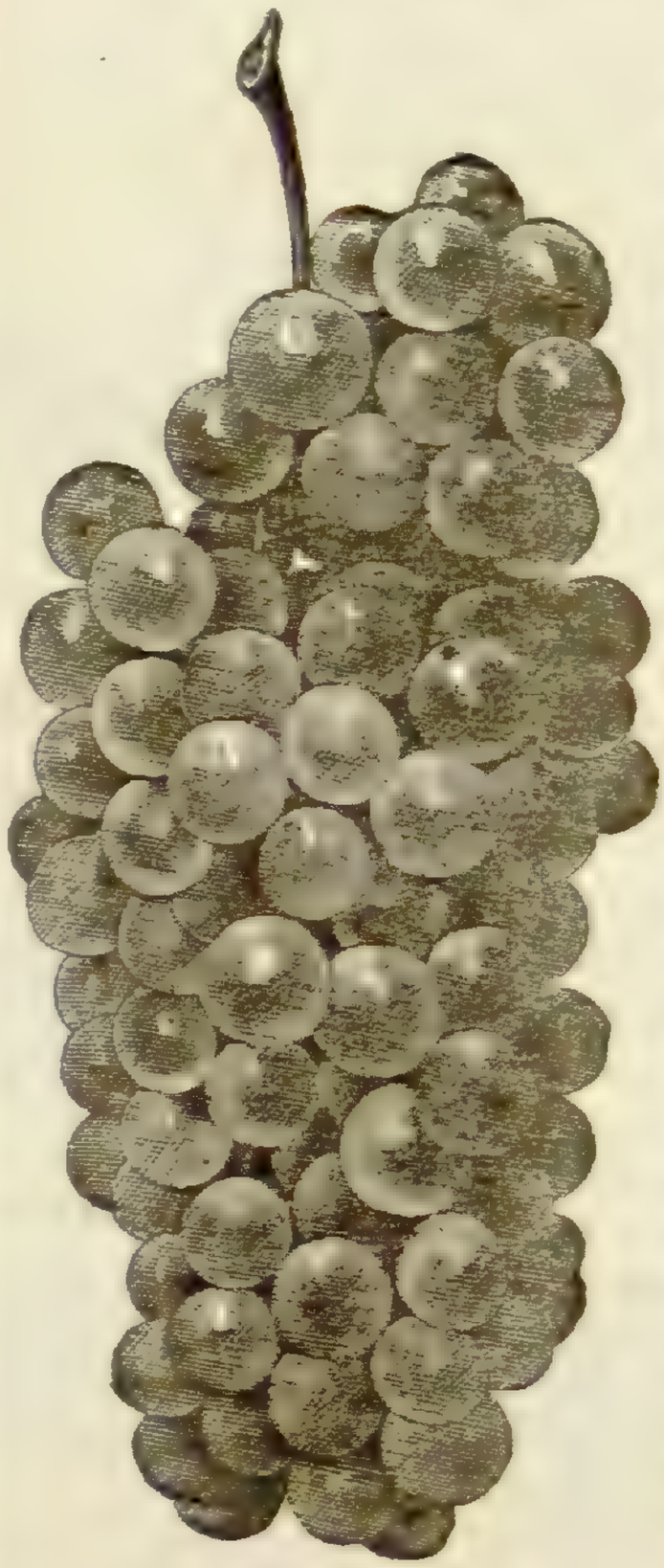
Under the name of *Champion*, as also the *Golden Champion*, another grape was introduced in California, which proves there a miserable failure.

Charlotte. Identical with Diana.

Charter Oak. (*Labr.*) A very large, coarse, native Fox grape, quite worthless, except for size, which makes its appearance as attractive as its musky flavor is repulsive.

Christine. (*Telegraph.*)

Claret. (?) A seedling of Chas. Carpenter, Kelly Island, O. *Bunch* and *berry* medium; claret red; acid; vine vigorous; not valuable.—*Downing.*



CLARA. (¼ SIZE.)

Clara. Supposed to be from foreign seed. A white (or pale amber) grape; very fine for the table; somewhat like Allen's Hybrid. *Bunch* long, loose; *berry* medium round, yellowish green, transparent, without pulp, sweet and delicious, but very uncertain. Rather tender and requires protection in the winter. Not worthy of cultivation since we have so many superior varieties. Nevertheless we hear it praised in France as one of the American varieties doing remarkably well there, being vigorous and productive, apparently Phylloxera-proof in the midst of badly infected vines (in the vineyard of M. Borty, at Roquemare). We are inclined to believe that the name is incorrect. The above figure of the Clara grape is reduced to one-fourth of natural size (one-half diameter).

Clinton. Syn., WORTHINGTON. (*Riparia.*) *Strong* says that, in the year 1821, the Hon. Hugh White, then in Hamilton College, N. Y., planted a seedling vine in the grounds of Prof. Noyes, on College Hill, which is still remaining, and is the original Clinton. *Bunches* medium or small, compact, not shouldered; *berry* round, below medium size, black with a blue bloom; skin thin, tough; flesh juicy, with little pulp, brisk and vinous; somewhat acid; sweeter the farther south it grows; colors early, but should hang late (until after the first frost) to become thoroughly ripe. Vigorous, hardy, and productive; healthy, but an exceedingly rank, straggling grower, and one of the hard-

est vines to keep under control; it requires a great deal of room and spur-pruning on old wood to bring forth its best results. Being one of the first to bloom in spring, it suffers sometimes from late frosts.

The leaf of the Clinton is in some seasons quite infested by the gall-louse (the Gallicola form of the Phylloxera), but its root enjoys a remarkable immunity from the puncture of this dreaded insect. The root-lice are found thereon, sometimes abundantly, but the vine does not suffer therefrom, while European vines by their side are quite destroyed. The Clinton was therefore recommended by us to Phylloxera-invaded France, and has been largely used there for several years, until the Taylor and, even more so, certain types of wild Riparia were found better adapted.

L. Giraud, Pres't of the Syndicat Pomerol. (Gironde), writes May 4, 1883: "My grafts of 1876, on the poor decried Clinton, give promise this year also of the most satisfactory returns. I have abandoned the grafting on Clinton, and prefer now the Riparia, on account of the large quantity of root-lice on the former, which makes it a bad neighbor for our French vines."

The fact that Clintons, even when teeming with Phylloxera, are comparatively free from mildew and rot, while other varieties much less infected by the insect suffer either by rot or mildew, and some even by both, refutes the theory that these diseases might be caused by the Phylloxera.

Roots thin and wiry, but very tough, with a hard, smooth liber, rapidly forming new fibers, or spongioles, and, though much infested by the Phylloxera, the insect seems to have little effect on the hard texture of the main roots. Canes rather slender, but long and rambling, with a full complement of laterals and strong tendrils. Wood rather soft and with a large pith.

Makes a fair, dark red wine, resembling claret, but of somewhat disagreeable taste, which, however, improves with age; *must* 93° to 98° and sometimes exceeding 100°.

Clinton-Vialla. (*Rip.*) By some supposed to be identical with *Franklin;* others say that the foliage of the Vialla is larger and darker, and that it is more productive and of a somewhat better quality. It is not known here at all, but it is esteemed in France as a superior grafting stock.

Clover-street Black. A Hybrid raised by Jacob Moore, from *Diana*, crossed by Black Hamburg. *Bunches* large, compact, shouldered; *berries* large, roundish, black, with a dark violet bloom; flesh tender, sweet. Vine moderately vigorous. Ripens with Concord.—*Hovey's Mag.*

Clover-street Red. Same origin as the preceding. *Bunches* larger than the Diana, loose, occasionally with a similar long stalk or shoulder appended to the top; *berries* large, roundish oval, crimson when fully ripe, with a slight Diana flavor. Vine a strong grower. Ripens with Diana.—*Hovey's Mag.*

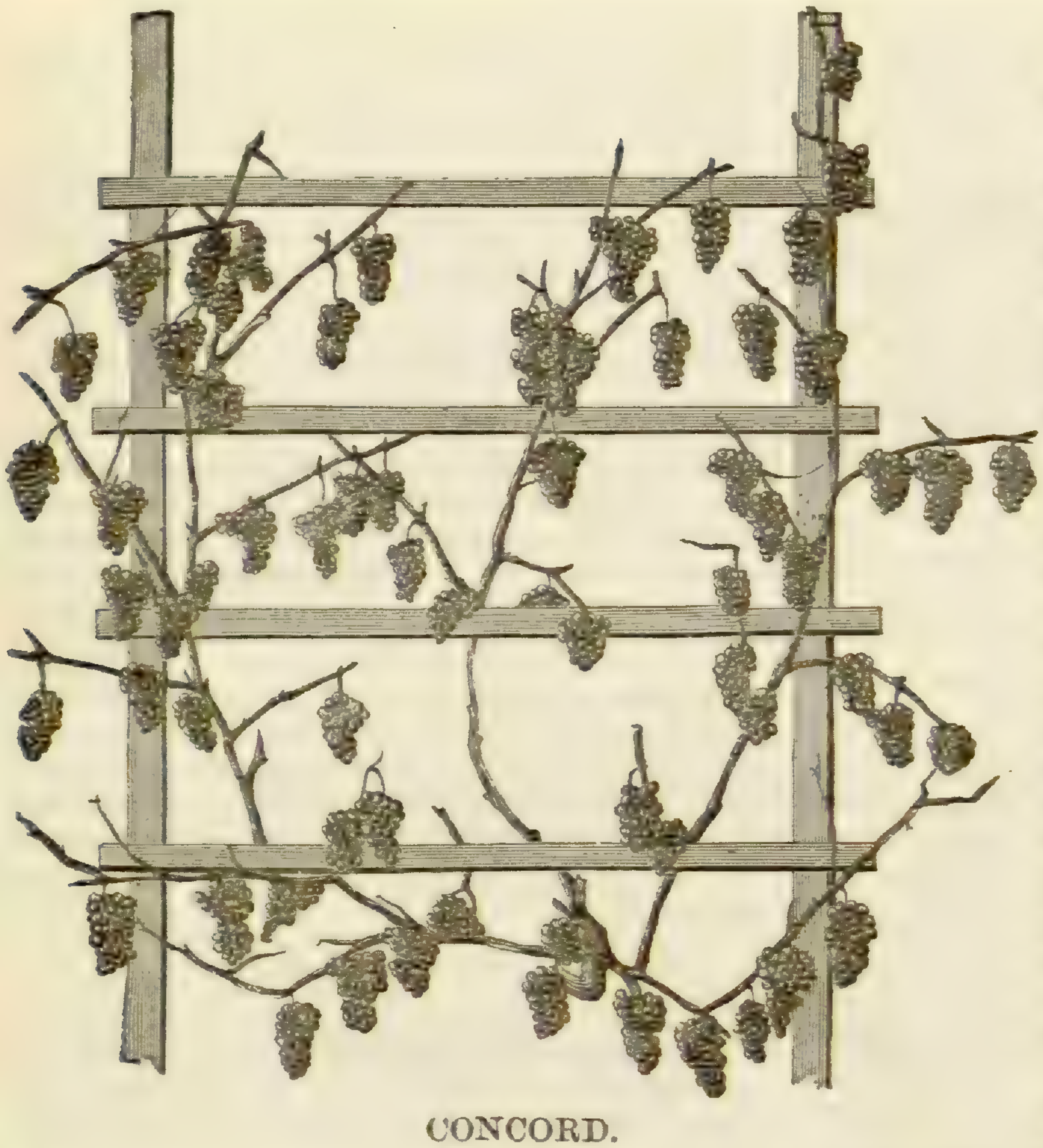
Coe. The Coe grape originated in Washington Co., Iowa. *G. B. Brackett*, chairman fruit committee, considers it as belonging to the *Labrusca* type, and kindly describes it for this Catalogue as follows:

"Vine a strong and free grower; withstands the vicissitudes of our climate well; it may be called an iron-clad; canes rather short-jointed, with healthy, durable leaf. *Bunches* small, compact, rarely shouldered; *berries* small to medium, black, rather fleshy than juicy. Ripens a week to ten days before Concord. While berry and bunch are smaller than *Hartford*, the berries of the Coe are sweeter, and do not crack nor drop prematurely. Brackett considers it valuable mainly for a northern climate.

Columbia. (*Rip.*) This grape is said to have been found by Maj. Adlum on his farm at Georgetown, D. C. A vigorous grower, productive; *bunch* small, compact; *berry* small, black with a thin bloom, with very little hardness or acidity in its pulp; not high-flavored, but pleasant and vinous; ripe last of September.—*Downing.*

Concord. (*Labr.*) This most popular American grape originated with E. W. Bull, Concord, Mass., who exhibited it for the first time on the 20th of Sept., 1853, at the 25th annual exhibition of the Massachusetts Horticultural Society, on Boston Common.

Bunch large, shouldered, rather compact; *berries* large, globular, black, thickly covered with a beautiful blue bloom; skin thin, tender, cracks easily; flesh sweet, pulpy, tender; colors about two weeks before the Catawba, but should be allowed to hang late, to develop all its good qualities, none too good at best. Not a good keeper, becoming insipid soon after being gathered. In some localities, however, especially in East Tennessee and parts of Virginia, the Concord becomes so very sweet and rich as scarcely to be recognized. *Roots* numerous, stout, above average hardness in texture, with medium liber, readily pushing new fibers under the attacks of Phylloxera. One of the best resistants among the Labrusca class, and was therefore exported as a grafting stock to Southern France, but proving ill-suited to some localities in that climate it was soon generally rejected; the *Taylor* and other *Riparia* varieties being much preferred as stocks for grafting. Canes of average thickness, long, rambling, with numerous and well developed laterals. Wood of medium hardness and pith. *Vines* very strong, rampant growers; coarse, strong foliage, dark green above, rusty beneath; has proved very hardy and healthy, and is immensely productive. This is well illustrated



CONCORD.

in the above engraving, from a photograph of a Concord grape-vine (cut from Jordan's vineyard and exhibited at the St. Louis Fair). In some localities, however, the Concord is often subject to *rot* on old vines. Its beautiful appearance makes it one of the most attractive market grapes; and, although its quality is not first rate, the popular taste has become so used to this variety that it is very much liked, and sells better than superior grapes of less attractive appearance. More vines of this one variety are planted than of all other varieties together. The fruit catalogue of the Am. Pomol. Society says of the *Concord*, "successful over a wider range of soil and climate than any other variety" (in 35 States of this Union); but it is now generally discarded in the SOUTHERN CENTRAL STATES, being found "unsuited to hot and dry climates."

The Concord makes a light red wine, which is effectually becoming the laboring man's drink; can be produced cheap enough, is very palatable, and has a peculiar, refreshing effect upon the system. A white wine may also be made of it by pressing the grapes without mashing them. Specific gravity of *must* varies from about 70° to 80°, according to location and soil, and in the S. A. S. its peculiar character (foxy taste) seems vastly improved.

M. Lespiault, in a report on American wines at the Bordeaux Congrès, 1881, says, "the Concord makes a popular wine which in France also, at M. Guiraud's, has the approbation of the working men. By separating the juice from the residuum (marc) before fermentation, neuter (less foxy) wines can be obtained which resemble some French white wines."

The hardiness, productiveness and popularity of the Concord induced many attempts to raise seedlings therefrom with a view to further improvements. Among those which have been named, some will remain almost unknown, except to their originators, being neither sufficiently distinct, nor yet superior in quality to their parent. But it is the duty of a complete Catalogue to mention the following:

The BLACK HAWK and COTTAGE are both earlier. (*See their description.*)

BURR'S SEEDLING CONCORD, orignated with John Burr, of Leavenworth, Kans.

BALSIGER'S CONCORD SEEDLING No. 2 resembles the best Concords and ripens later.

The EATON'S SEEDLING, originated by the late Galvin Eaton, of Concord, Mass.,; attracts much attention at the northern fruit limits, producing very large, handsome *bunches* resembling Concord, but with much larger *berries* and less of the native odor.

The LINDEN, by T. B. Minor, of Linden, N. J., is said to be better in quality, and keeping longer than the Concord, but smaller in berry and cluster.

The MAIN grape was claimed to be earlier, but proved to be a Concord, only under another name.

The MODENA, raised by A. J. Caywood, of Poughkeepsie, N. Y., known to us by name only.

MOORE'S EARLY, raised in 1872 by John B. Moore, of Concord, Mass., has taken the $60 prize of the Mass. Horticult. Society as the best new early seedling in fall of 1877; it is from one to two weeks *earlier* than Concord, bunches not as large nor as weil shaped, berries larger but quality no better than Concord, nor as strong a grower. (*See descr.*)

McDONALD'S ANN ARBOR, originated with A. McDonald, Ann Arbor, Mich., in 1877, from Concord seed; is also *black*, and ripens with Hartford Prolific. Vine said to be an extra strong grower, perfectly hardy and healthy. *Bunch* very large, shouldered; *berry* extra large.

NEW HAVEN, by J. Valle, of New Haven, Mo., resembling Concord in wood and foliage, ripens a week earlier. *Bunch* and *berry* medium, of very good quality. Deserves to be better known.

The PAXTON, by F. F. Merceron, of Catawissa, Penn., is said to be quite similar to Concord.

ROCKLAND FAVORITE, mentioned in Elwanger & Barry's Catalogue as a new seedling of the Concord; claimed to be earlier and better than its parent, and a splendid bearer.

STORM KING, originated by E. P. Roe, Cornwall, on the Hudson, N. Y.; is a sport of a Concord vine, said to bear since many years large, heavy-shouldered *bunches* resembling Concord in every respect, but with *berries* nearly twice as large, black, round, with but little foxiness.

WORDEN'S SEEDLING (see description).

YOUNG AMERICA, by Sam. Miller, of Bluffton, quite resembles Concord.

See also COTTAGE (page 86) and UNA (*white*), raised by E. M. Bull, himself, from Seedlings of his Concord—its grandchildren, as it were.

By these experiments it was found that the *Concord* shows a strong tendency to produce *white* seedlings, of which *Martha* was the earliest, and became one of the leading varieties.

EVA and MACEDONIA, both raised by Sam. Miller from Concord seed, were similar to Martha, and therefore abandoned by him; though in some localities, as about Louisville, the EVA is considered much superior to Martha.

GOLDEN CONCORD, by John Valle, of New Haven, Mo., is a poor grower, inferior to Martha; we do not think that it deserves propagation as a distinct variety.

MASON'S SEEDLING is of far greater merit (see description).

F. Muench, F. J. Langendorfer, J. Balsiger, and many others, have raised white Concord seedlings; some of them may prove superior to Martha in quality. BALSIGER'S No. 32 has hardly any foxiness about it; its *must*, weighing 84°, was ripe on the 15th of August in our latitude, and hanging freely to the vine in good condition till October.

The bunches and berries of these white Concord seedlings are smaller in size, about like Martha; but less subject to rot, it seems.

The LADY (see description) is an improvement on the Martha in quality, and is recommended as such by good authority.

Among the many pure Concord seedlings claimed to have better qualities than the parent and to prove of great value, is also that large and showy *new white grape* named

POCKLINGTON (see this variety). Also, the

WHITE ANN ARBOR, raised from Concord seed by C. H. Woodruff, of Ann Arbor, Mich., in 1870. It is said to come nearest to the Pocklington in size and to be a very fine white grape, perfectly hardy, and earlier than Concord; but it has the fault of dropping from the stem, and the committee on new native fruits of the Am. Pomol. Society, 1881, pronounced it too acid. The sample then exhibited may not have been fully ripe.

Greater improvements, however, have been achieved by hybridizing the Concord with European varieties; but, while grapes of superior quality were thus produced, their hardiness, health and productiveness is generally doubted. See "Hybrids," in Manual; see, also,

"TRIUMPH" and "LADY WASHINGTON," in description of these varieties.

Conqueror. A seedling raised by Rev. Archer Moore, N. J., and by him supposed to be a cross between Concord and Royal Muscadine. Very early; *bunches* long, loose, shouldered; *berries* medium, glossy black with a bloom; flesh slightly pulpy, juicy, sweet. Vine a free grower, hardy, healthy, and prolific. With us the Conqueror is doing remarkably well, proves less subject to rot than any other hybrid; nor can we see any trace of foreign blood in either foliage, growth, or appearance; it seems to be rather a cross between Concord and some Riparia variety, and is worthy of more extended cultivation.

Corporal. (*Hybr.*) A new grape, originated by D. S. Marwin, Watertown, N. Y. *Bunch* and *berry* medium; loose; color black; a showy, good grape. (Amer. Pomol. Society, Report on New Fruits, 1881.)

Concord Chasselas.—A Hybrid grown from Concord seed, by Geo. W. Campbell, of Delaware, O., who described it as follows:

"*Bunch* rather long, usually shouldered, handsomely compact without being crowded; *berries* large, round; skin very thin but tenacious and semi-transparent; seeds few and very small; color, when fully ripe, a rich amber with a thin white bloom, almost identical in appearance with the foreign Golden Chasselas; flesh perfectly tender and melting, just enough vinous acid to prevent cloying the most delicate palate; wholly free from any vestige of foxiness, and a grape that will satisfy the most fastidious taste formed upon the foreign standard. Ripens same time as the Concord. The vine is very vigorous in growth; large foliage, thick and abundant, resisting mildew in fully exposed locations here as well as the Concord.

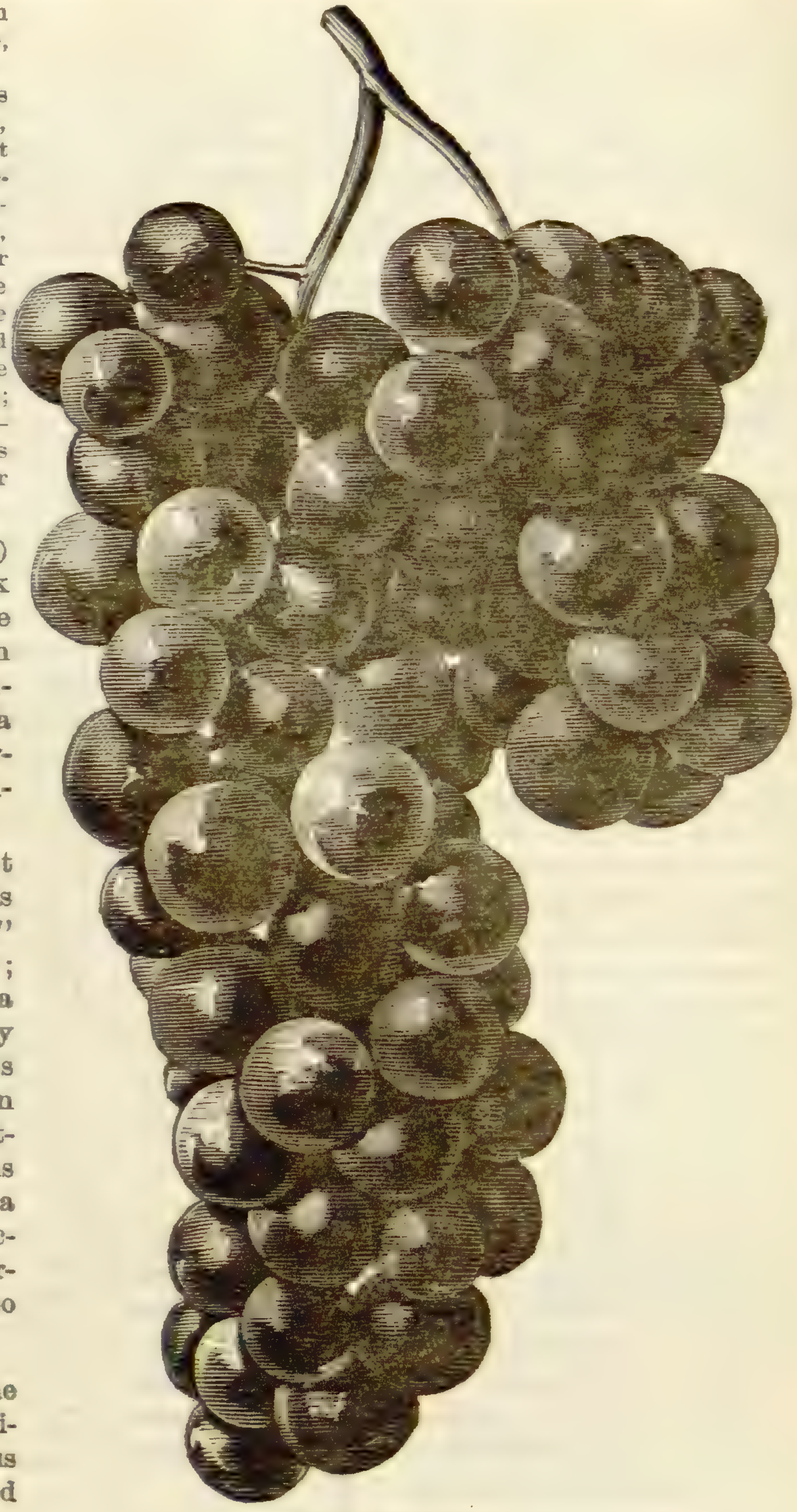
Concord Muscat. (*Hybr.*) Also grown from Concord seed by Geo. W. Campbell, of Delaware, O., who gives the following description of it:

"*Bunch* long, moderately compact, sometimes shouldered; *berries* very large, oval; skin thin, rather opaque; seeds few and small; color light greenish-white with delicate bloom; flesh entirely tender and melting, with no pulp or astringency next to the seeds; flavor rich, sugary, slightly sub-acid, with the peculiar high flavor which is the distinguishing charm and excellence of the foreign Muscats and Frontignans. There are really few grapes among the most admired foreign kinds which equal this variety in pure flavor and high quality. Vine very vigorous; foliage large and moderately thick; resists mildew, except in very unfavorable seasons. In this respect it is better than Eumelan, Delaware, or Rogers' Hybrids, but not equal to Concord."

Cornucopia. (Arnold's Hybrid No. 2.) A seedling of Clinton crossed with Black St. Peters. Vine much resembling the Clinton in appearance, but superior in size of berry and bunch, and greatly superior in flavor; a healthy grape and a great bearer. The Paris (Canada) Horticultural Society reported on it as follows:

"This is undoubtedly one of the best grapes in the whole collection of Arnold's hybrid grapes—a very promising grape." *Bunch* large, shouldered, very compact; *berry* above medium size, black with a beautiful bloom, flavor excellent, very sprightly and pleasant; skin thin; seeds large, bearing nearly the same proportion to size of berry as in Clinton; flesh melting, with very little, if any, pulp—seems to burst in the mouth; all juice, with a little acid and astringency; very productive. Ripens with Concord. A good market grape and "a good keeper"; also valuable for wine.

Cottage. (*Labr.*) A seedling of the Concord raised by E. W. Bull, the originator of that variety. A strong, vigorous grower, with remarkably large and leathery leaves, and abundant strong, branching roots; *bunch* and *berries* about the size of Concord, but of a somewhat darker shade; ripens before Concord; quality better than the parent, with less of the foxiness peculiar to the other, but also less suited to some soils and localities than the Concord. In the Bushberg vineyards it is giving better satisfaction than *most* other Labrusca varieties while in some other localities it is not as strong a grower nor as heavy a bearer as Concord, and in some places even does poorly.



CORNUCOPIA.

Mr. Bull, in his successful efforts to improve our native grapes, began by sowing the seeds of a wild grape (V. Labrusca), from which he raised seedlings. He then sowed the seed raised from these and obtained others, among which was the Concord. He then raised 2,000 seedlings before he got any that surpassed the Concord. In the fourth generation, or grandchildren of the Concord, he obtained seedlings far superior to the Concord and nearly equal to the European grape (V. Vinifera). There seems to be no reasonable doubt that, as Mr. Bull thinks, the wild grape can, in a few generations, be made equal in quality to the European vine.—*U. S. Agr. Report for* 1867.

Mr. Bull's experimental garden is a sandy hillside, soil poor in organic matter but rich in iron. He uses no rich manures; his vines get a little ashes and bonedust, and good culture. Mr. Bull has not succeeded in rais-

THE CROTON GRAPE.

ing another seedling which would fulfill his sanguine hopes, though thirty years have elapsed since he raised the Concord. But to have raised *this one* is sufficient cause for satisfaction; and it is so much more to the credit of Mr. Bull that he continued his efforts, as they were never rewarded by any pecuniary profits.

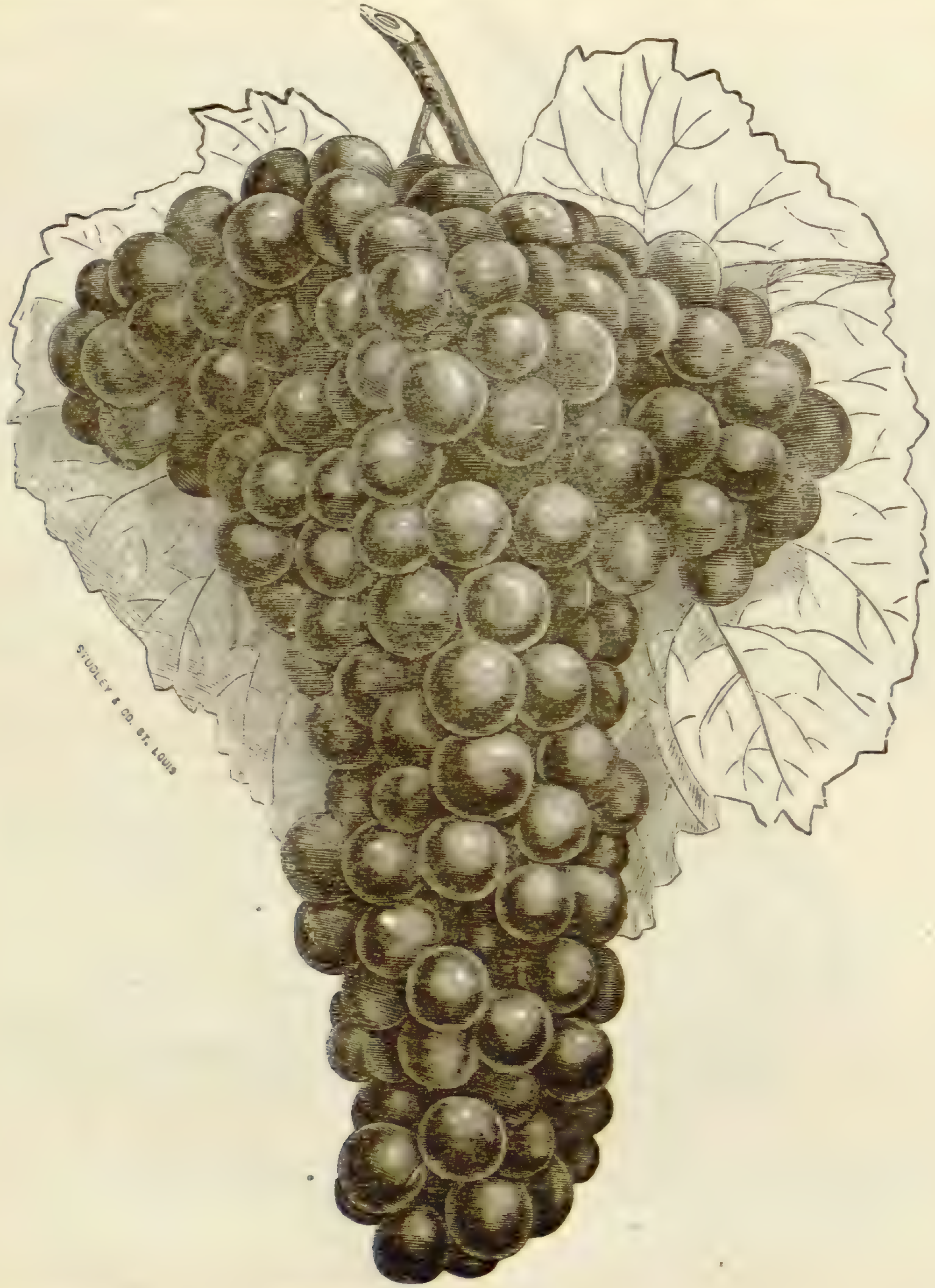
Cowan, or McCowan. (*Rip.*) *Bunch* and *berry* medium; black; rather harsh and austere. Not desirable.—*Downing.*

Croton. Hybrid cross between Delaware and Chasselas de Fontainbleau, originated by S. W. Underhill, of Croton Point, N. Y.; bore its first fruit in 1865. In 1868 and following years it obtained prizes at the New York, Pennsylvania and Massachusetts Horticultural Societies and other grape exhibitions, attracting marked attention. The late H. E. Hooker, of New York, said: "The Croton succeeds very well indeed in *some* localities, and it is certainly one of the most delightful grapes, when well grown, that I have ever raised."

Bunch often 8 to 9 inches long, moderately compact, and shouldered; the shoulder often nearly as large as the bunch, and the clusters frequently winged; *berries* of medium size, of light yellowish-green color, translucent, and remarkably delicate in appearance; flesh melting and sweet throughout; quality *best*, with much of the flavor and character of the Chasselas. Ripens early. Some very prominent pomologists say that it is one of the best hardy grapes they have tasted, and report the vine as hardy, vigorous, and productive; others, that it does not succeed at all;—even grafted on strong roots, it remained unproductive and worthless with western growers. Our own experience has been very unfavorable, as the vine is very tender, a weak grower, with a tendency to mildew and rot. We cannot recommend it for general cultivation, but only as a valuable amateur fruit, one of the most beautiful in appearance and exquisite in flavor.

Cunningham. Syn., LONG. (*Æst.*) A southern grape, of the *Herbemont* class; it originated in the garden of Jacob Cunningham, Prince Edward Co., Va. Dr. D. N. Norton, the same who introduced to notice our invaluable Norton's Virginia grape, made wine from the Cunningham in 1855, and furnished to the Elder Prince, of Flushing, Long Island, the stock from which this grape has been disseminated. In *this latitude* and FARTHER SOUTH, the Cunningham is VERY *valuable* for southern slopes with poor, light limestone soils. Transplanted to southern France, it was there considered as one of the most valuable American grapes, the quality of which was admitted to be equal to that of some of their own favorite varieties.

Bunch very compact and heavy, medium, long, not always shouldered; *berries* small, purple-brownish black, juicy, and vinous. Vine a very strong grower, HEALTHY, and productive; to be so, however, it needs spur-pruning on laterals, and light winter protection. It should be planted only in favorable locations, where the *Herbemont* succeeds best. *Roots* of medium



THE CUNNINGHAM GRAPE.

thickness, inclined to be wiry, straight, tough, with a smooth, hard liber. The Cunningham is one of the *best* resistants to the Phylloxera. Canes not numerous, but very stout and vigorous, often attaining a length of 30 or 40 feet in one season; wood hard with a medium sized pith, and a hard, thick outer bark adhering closely even on the ripe wood, a characteristic common to all the Æstivalis class. Ripens its fruit very *late*, and makes one of the most aromatic and delightful wines, of dark yellow color. *Must* 95° to 112°.

Cynthiana. Syn., RED RIVER, ARKANSAS. (*Æst.*) Received by Husmann, in 1858, from William R. Prince, Flushing, Long Island, N. Y. Origin, Arkansas, where it was probably found growing wild. It is a true Æstivalis in all its habits, and resembles Norton's Virginia so closely that it is impossible to distinguish the wood or leaf, although the bunch is

THE CYNTHIANA GRAPE.

perhaps somewhat more shouldered, the berry more juicy and somewhat sweeter, and the season for its ripening earlier. This difference, however, and other points hereinafter mentioned, are attributed by many viticulturists to difference of location, soil, and aspect, and are not deemed sufficient by them to justify its being considered a separate and distinct variety from Norton's Virginia Seedling. We are not fully prepared to decide, but are inclined to side with those who consider the *Cynthiana* different from and superior to *Norton's*.

Bunch of medium size, moderately compact, shouldered; *berry* below medium, round, black with blue bloom, sweet, spicy, moderately juicy. Juice very dark red; weighs very heavy on the must scale, even higher than Norton's Virginia, and, so far, makes *our best red wine*. It has as much body as Norton's Virginia, is of exquisite flavor, more delicate than Norton's, and can safely enter the lists with Burgundy wines. The Norton's, however, seems to possess medicinal ingredients (tannin) in a higher degree. Vine vigorous and healthy, free from

rot, productive, and as sure *here* in its crops of well ripened fruit as any variety we know, but very difficult to propagate, as its wood is very hard, with a small pith and closely adhering outer bark. The fruit ripens some few days earlier than Norton's. Specific gravity of *must* from 98° to 112°, according to the season. We can confidently recommend the *true* Cynthiana as *the best grape for red wine* which we have tried.

Our Cynthiana wine was awarded the First Medal of Merit at the World-Exposition, Vienna, 1873, and is gaining the "blue ribbon" at every test. The commission at the Congrès de Montpellier, France, 1874, reported: "Cynthiana of Mr. Bush, a red wine of fine color, rich in body and alcohol, reminding us of old Roussillon wine." It says the same of Cynthiana exhibited by Poschel & Sherer. Nuesch, formerly of Dr. Lawrence's Ouachita vineyard, near Hot Spring, Ark., who got his plants from us, says: "We find the Cynthiana hardier than the Norton, and a few days earlier in ripening." Muench wrote us: "Too much cannot be said in praise of the Cynthiana; its wine, two or three years old, cannot be excelled by the best red wines of the old world." We look upon it as our BEST AND MOST VALUABLE grape for red wine, and have bestowed special attention on its propagation.

Creveling. Syn., CATAWISSA, BLOOM. (*Labrusca*, ×) Columbia County, Pennsylvania. *Bunches* long, loose on young vines, but on old ones sometimes as compact as Concords; at other times very loose, by imperfectly setting its fruit. *Berries* medium to large, slightly oval, black with blue bloom; flesh tender, juicy, and sweet; quality best. Ripens early, a few days later than Hartford, and before Concord. Vine a fair grower, healthy, and hardy, but not free from rot and mildew; may be planted 6 by 6 feet apart, on northern and northeastern hillsides. *Roots* thick and warty, and comparatively few; texture soft, with a thick liber, forming young fibers rather slowly; canes long and rambling, slender, long-jointed, and with few laterals; wood soft, of a reddish color, with a large pith.

In all these characteristics there is scarce a trace of the Æstivalis, for which class some would claim the Creveling.

This grape for a time was rapidly growing in favor; this it has not deserved, as it is often very unproductive, setting its fruit imperfectly.

Mr. Knight, proprietor of a vineyard of fifty acres near Philadelphia, is reported to have lately dug up five acres of the Creveling, because he has found it unsatisfactory as a market grape; it would be still more unprofitable as a wine grape, and can only maintain its place as a fine family grape for garden culture. Rev. Burnet, of Ontario, who has planted and cultivated the *Creveling* intermingled with *Concord*, says that he found it "everything that could be desired, both in regard to the bunch and the berry"—ascribing it to impregnation by the Concord.

Cuyahoga. Syn., WEMPLE. (*Labr.*) A chance seedling found and grown by ——Wemple, of Collamer, Cuyahoga Co., Ohio. Vine a strong grower; requires a *warm*, sandy soil, and exposure, to make it desirable at the north; but when well grown it is of fine quality. South it casts its foliage and is not valuable. *Bunch* medium, compact; *berry* medium, dull greenish-amber when fully ripe; flesh tender, juicy, rich, vinous, sweet. Ripens with the Catawba or a little later.

Dana. A seedling grown by the late Francis Dana, of Roxbury, Mass., and described in the "Massachusetts Horticultural Transactions." *Bunch* medium, shouldered, compact, with a peculiar red stem; *berries* rather large, round, *red* with a rich, heavy bloom, so that when fully ripe they appear almost black; flesh as free from pulp as Delaware; not so sweet, but more spirited and vinous, yet not an acid grape.

John B. Moore & Son, Concord, Mass., who own the parent vine, say further of this grape, that the vine is a strong grower and perfectly hardy, the foliage clean(?) and healthy. *Bunch* as large as the Concord at its best; similar to the Red Chasselas in quality and color, and supposed to be a *pure native* seedling. Ripens with Concord.

Dempsey's Seedlings, see BURNET (p. 79.) There are others designated by numbers only, and very little known outside of Ontario.

Detroit. (*Labr.*) This variety is supposed to be a seedling of Catawba. It was found in a garden in Detroit, Mich. Not having seen the fruit, we copy from description in the Horticulturist: "Vine very vigorous and hardy. Foliage resembling Catawba; wood short-jointed; *bunches* large, compact; *berries* very dark rich brown claret with a light bloom, round and regular; flesh with very little pulp, rich and sugary. Ripens earlier than the Catawba."

Diana Hamburg, (*Hybr.*) Said to be a cross between the Diana and Black Hamburg, originated by Jacob Moore, of Rochester, N. Y.; *bunches* generally large, sufficiently compact, well shouldered; *berries* above medium, slightly oval, of a rich fiery-red color when fully ripe; flesh tender, of very sweet flavor, equal to some of the finer foreign sorts. Vine a weak grower, with short-jointed, firm wood, very tender; leaves of medium size, crimped, and sometimes rolled in; subject to mildew. Its fruit ripens after the Concord, but before its parent the Diana. We may as well state that at least three independent parties are reputed to have made this hybrid, and several crosses of the foreign Black Hamburg on the Diana may exist. Ours is from J. Charlton, Rochester, N. Y., but it proved *worthless*. We might as well attempt to grow the Black Hamburg in open air. Its propagation should be given up—at least we have done so.

Delaware. Origin unknown. It was found many years since in the garden of Paul H. Provost, Frenchtown, Hunterdon Co., N. J., who had immigrated from Switzerland, and brought with him many varieties of foreign grapes, which he cultivated in his garden. It was first known as the "Italian Wine Grape," then it was supposed to be the "Red Traminer," or a seedling from this variety. We have strong reasons to believe it a hybrid between the *Vitis Labrusca* and *V. Vinifera.*

This variety, first brought to notice* by A. Thompson, Delaware, O., is considered to be one of the best, if not *the best*, of all American grapes. It seems ENTIRELY FREE FROM ROT in all seasons, and its perfect hardiness and unsurpassed quality and popularity, both as a table fruit and for wine, places this variety at the head of American grapes. Unfortunately and from various causes, it does not, succeed well in many localities; it should be planted in deep, rich soil, open and well-drained, *here* on northeast and eastern slopes, and requires good cultivation (thinning the crop) and pruning to short laterals. Its *roots* are slender, and not inclined to branch out much; of medium toughness, with a rather soft liber. Canes proportionate, in length and thickness, with an average number of laterals. Wood hard, with a small pith. It is a slow grower. Fourteen hundred and fifty vines may well be planted to the acre, 5 to 6 feet being a sufficient distance. The Delaware is exceedingly hardy, enduring uninjured the severest winters, if the vines are healthy. In some localities it yields a sure and abundant crop, and is entirely without a rival for the production of a fine white wine. In some parts of Michigan (St. Joseph, Benton Harbor), for instance, it annually produces (since 1864 to this day) as many pounds to the vine as the Concord, and is even more certain. In Maine also it is considered "altogether the best grape we have." In other localities, however, it has been found subject to mildew or leaf-blight, and this tendency is greatly aggravated by allowing the vines to overbear, which the Delaware, if permitted, is sure to do. Good authorities recommend a slight coping over the vines as a protection against mildew. Its root

DELAWARE.

was supposed to be sensitive to Phylloxera, and its leaves are often covered with galls produced by this insect; but Reich of Armeillère, the eminent grape-grower of the Rhone-Delta, has furnished proof that this variety also is successfully resisting the attacks of Phylloxera. He artificially infected them with the insect, three times each year, without doing them any harm.

Bunch small to medium, compact; clusters usually shouldered; *berries* below medium, round; skin thin, but tenacious; pulp sweet and tender; juice abundant, rich, vinous and sugary, sprightly and refreshing; color a

* Am. Pomol. Society, 1855.

beautiful light red or purplish-maroon, covered with a thin whitish bloom, and very translucent. It is without harshness or acidity in its pulp, exceedingly sweet, but sprightly, vinous and aromatic. Ripens early, about eight days later than Hartford Prolific. Quality best, for the table as well as for wine. *Must* 100°–118°. Acid 5 to 6 per mill.

When the former editions of this Catalogue were published, *seedlings* from Delaware and its crosses with other varieties were but little known, though innumerable attempts had been made to raise them. Expectations to produce therefrom a grape of superior value, larger only in size of bunch and berries, yet of the quality of the Delaware, seemed doomed to disappointment. Most of its seedlings showed more or less of the "*Fox grape.*" This fact and other characteristics (see *Manual*—Table of Grape Seeds, &c.) convince us of its origin, *in part*, from this species, although many eminent horticulturists and botanists class the Delaware with *Æstivalis* (others with Riparia). It is true that the Delaware leaf seems more closely allied to Æstivalis; its wood is harder, more difficult to propagate, and the tendrils are not continuous (nor are they regularly intermittent); but we find a remarkable parallel case in "*Sheppard's Delaware,*" raised from seed of Catawba by J. N. Sheppard, in 1852. From him *Charles Downing* received it, with its history, and says, "*the vine and fruit are similar in all respects to Delaware.*" The "WHITE DELAWARE," raised by G. W. Campbell from seed of Delaware, has large, thick foliage "*resembling Catawba more than Delaware.*" Another White Delaware seedling raised by H. Jaeger, of Neosho, shows the same characteristics, and the fruit has a musky flavor; probably it has not proved valuable, or else more would have been heard of it. Of late, however, several very promising hybrids of Delaware crossed with Concord and other Labruscas have been produced, especially the DUCHESS. (*See Descr. of this Var.*; also *List C of Hybr. in Manual, p.* 28.)

J. Rommel has lately produced a BLACK DELAWARE seedling which is very early, of fine quality, and may become valuable, as it seems to do well in localities and soils where the old Delaware fails. Two *White* Seedlings of Delaware, one named KALISTA, the other LACCRISSA, are reported by *J. Sacksteder*, of Louisville, Ky.; they are said to be of superior quality, rich in flavor, better growers than their parent and to hold their foliage until fall.

Devereux. (*Æst.*) Syn., BLACK JULY, LINCOLN,? BLUE GRAPE, SHERRY, THURMOND, HART, TULEY, MCLEAN, HUSSON (LENOIR, incorrectly; the name BLACK JULY is also objectionable, being used by English ampelographs for the ISCHIA NOIR, or NOIR DE JUILLET, a PINEAU variety—*Vinifera*—with which the DEVEREUX has no resemblance.) A southern grape; belongs to the same class as Herbemont and Cunningham. Where this variety will succeed it is one of our best wine grapes, producing a white wine of exquisite flavor. It is somewhat subject to mildew, very tender, and requires covering in the winter. North of Missouri it should not be tried, but here it succeeds admirably on southern slopes, in very favorable seasons; never on wet, cold soils. Our southern grape-growers especially should plant some of it. *Bunch* long, loose, slightly shouldered; *berry* black, below medium, round; skin fine, tender; flesh meaty, juicy, without pulp, and vinous; quality best. Vine a strong grower, and, when free from mildew, moderately productive; wood long-jointed, purplish-brown at first, of deeper purplish-red when ripe; with bi-forked, intermittent tendrils—these, as also the leaf-stalk, are tinged on their base with a purplish-brown hue, like the young canes; the buds are covered with a russet down, unfolding with that rosy complexion peculiar to the young downy leaves of most Æstivalis. The developed foliage is of medium size, entire (not lobed), considerably wrinkled, turgid, with somewhat abundant hair-tufts on the lower veins.

Don Juan. One of Rickett's Hybrid Seedlings, much like its parent *Iona*. F. R. Elliott says: "It is better than any known hardy grape of its color; is about the size, in berry, of Rogers' 15, a deeper color, and a larger and better bunch; the flesh is vinous, sweet and sparkling." (See "Rickett's Seedlings.")

Downing, or Charles Downing. A Hybrid obtained by James H. Ricketts, Newburgh, N. Y., from the Croton fertilized by Black Hamburg. "*Bunches* large, sometimes shouldered; *berries* large, slightly oval, nearly black with light bloom; flesh tender, breaking somewhat like the foreign sorts; in flavor it is first rate, being sweet, with just enough sprightliness to prevent cloying the palate."—*Fuller.*

The vine is said to be a vigorous grower, with healthy foliage. Its parents forebode the reverse. According to other reports, it was produced from Israella crossed with Muscat-Hamburg. It has an unusually long bunch and large, oblong berries—a remarkable grape. Mr. Ricketts must have valued it highly, else he would not have given it the name of our revered great Pomologist. But it is not disseminated.

Diana. (*Labr.*) A seedling of Catawba, raised by Mrs. Diana Crehore (who still lives, at the age of 87!), Milton, Mass.; first exhibited in 1843, before the Massachusetts Horticultural Society. Fuller justly remarks:

"There is probably no one variety of grape in cultivation in regard to which there is a greater diversity of opinion, and its variableness fully warrants all that is said about it. In one section it is really excellent, while in another, perhaps near by it, it is entirely worthless. This difference is often observable in the same garden, and from no apparent cause."

The Diana seems to do best in warm, rather dry and poor soil; gravelly clay or sandy loam seems best suited to its wants. Is reported to do remarkably well in Georgia. *Bunches* medium, very compact, occasionally shouldered; *berries* medium size, round, pale red, covered with a thin lilac bloom; flesh tender, with some pulp, sweet, juicy, with a musk flavor that is very strong until the fruit is fully ripe, and then often offensive to some tastes. Colors its fruit early, but does not really mature much earlier than the Catawba. Vine a vigorous grower, requiring much room and long pruning, and increases in productiveness and good quality as the vines get age; *roots* few, but long and thick, soft in texture, and with a thick liber; canes heavy and long, with few laterals, and a very large pith. It is not as productive, nor quite as large in bunch and berry, as its parent, but some think it superior in quality; unfortunately it is just as frequently suffering from mildew and rot as the Catawba. Its berries hold well, and its thick skin enables it to withstand changes of temperature better; hence the Diana improves by being left upon the vine until after pretty severe frost. As a variety for packing and keeping, it has no superior. *Eastern* grape-growers claim it to be valuable also for wine. *Must* 88°–90°; acid 12.

DIANA.

Dracut Amber. (*Labr.*) Originated by J. W. Manning, Dracut, Mass. Vine very vigorous. Regarded by us as but a slightly improved wild Fox grape; very early and productive. *Bunch* large and long, compact, often shouldered; *berries* large, round; skin thick, of pale red color, pulpy and foxy; too foxy for our taste, and should be discarded, when so many better varieties can be grown. Yet some *new* varieties, quite similar, and but very little, if any better, are continually introduced. (See Wyoming Red.)

Dunlap. One of Rickett's Hybrids, a fine red grape. Not disseminated.

Dunn. (*Æst.*) A new grape obtained from a Mr. Dunn in W. Texas, and named after him by G. Onderdonk, Mission Valley, Texas. *Vine* a vigorous grower, in habit and foliage precisely like the *Herbemont*, but *bunches* generally not shouldered, and *berries* above Herbemont in size and paler in color; ripens about when the Herbemont is gone, which is a valuable feature for southern Texas and similar southern climates, but makes it unfit for our northern and even for the central States.

Further experiments make it doubtful whether this variety is sufficiently distinct from the Herbemont, and whether the difference in size and time of ripening may not have been due to other circumstances, conditions of soil, &c. No plants will be sent out until this has been determined.

Duchess, a new, fine white table-grape, raised near Newburgh, N.Y., by A. S. Caywood & Son, who states that "it was produced by crossing a WHITE CONCORD Seedling with DELAWARE or WALTER, the pollen of both being applied at the same time." The *vine* is a vigorous grower, with moderately short-jointed shoots; *leaves* large, light green, rather thick, coarsely serrated, adhere to the vine very late in the season; vine abundantly productive. *Bunch*, medium to large (from ¼ to ¾ lbs. each), shouldered, occasionally double-shouldered, compact; *berries* medium, roundish, inclining to oval; skin rather thick, light green at first, but pale greenish-yellow when mature, sometimes a golden yellow where fully exposed and gathered late, and covered with a thin whitish bloom; flesh tender, free from pulp, juicy, sweet, spicy, rich, and of excellent quality; the berries adhere strongly to the peduncle, and the fruit keeps a long time after being gathered. Ripens soon after the Concord. —*Charles Downing.*

***John J. Thomas*, recognized as good authority among pomologists, says: In quality, it is unquestionably one of the most delicious of all out-door varieties, and in growth the vines possess great vigor and hardiness, withstanding our winters uninjured. President *Wilder*, says: "The Duchess is as well adapted to exportation as the White Malaga, and is of much better quality; I think it is the beginning of the production of grapes for export." In a discussion on the new grape, at the Am. Pomol. Society meeting, 1881, Mr. Caywood remarked "that the Duchess will not endure high feed. It grows rampantly, making thirty feet on the vines at three years old. It is a grape for the poor man. It will grow without obliging him to spend all the money the grapes bring for fertilizers." He assures us also, that: "It ripens with Concord and carries better than any other known variety, having been sent to California and back again in good condition, and five weeks afterward the same clusters were sent to the exhibition at Atlanta, Ga. It keeps without difficulty until spring. All grapes that carry well keep well from the same general cause." Testimony as to the excellence of the Duchess grape has been received from many of the most eminent authorities in the country. It is, in our opinion, one of the best white grapes and second to none for family use.**

Early Dawn. (*Hybr.*) An early black grape of fine quality which originated with Dr. Wm. A. M. Culbert, of Newburgh, N. Y., being a cross of Muscat-Hamburg & Israella; vine healthy, vigorous, and very productive; wood moderately short-jointed; leaves large, thick and firm, roundish, broadly but not deeply serrated, sometimes slightly lobed. *Bunch* medium to large, long, shouldered; *berry* medium, round, black with a thick blue bloom; skin thin but firm; flesh tender, juicy, sweet, slightly vinous, rich, and of very good quality; the fruit adheres well to the peduncle, keeps well, and is a valuable addition to the early grapes; either for the table or market. Ripens a week or more before the Hartford Prolific.—*Chas. Downing.*

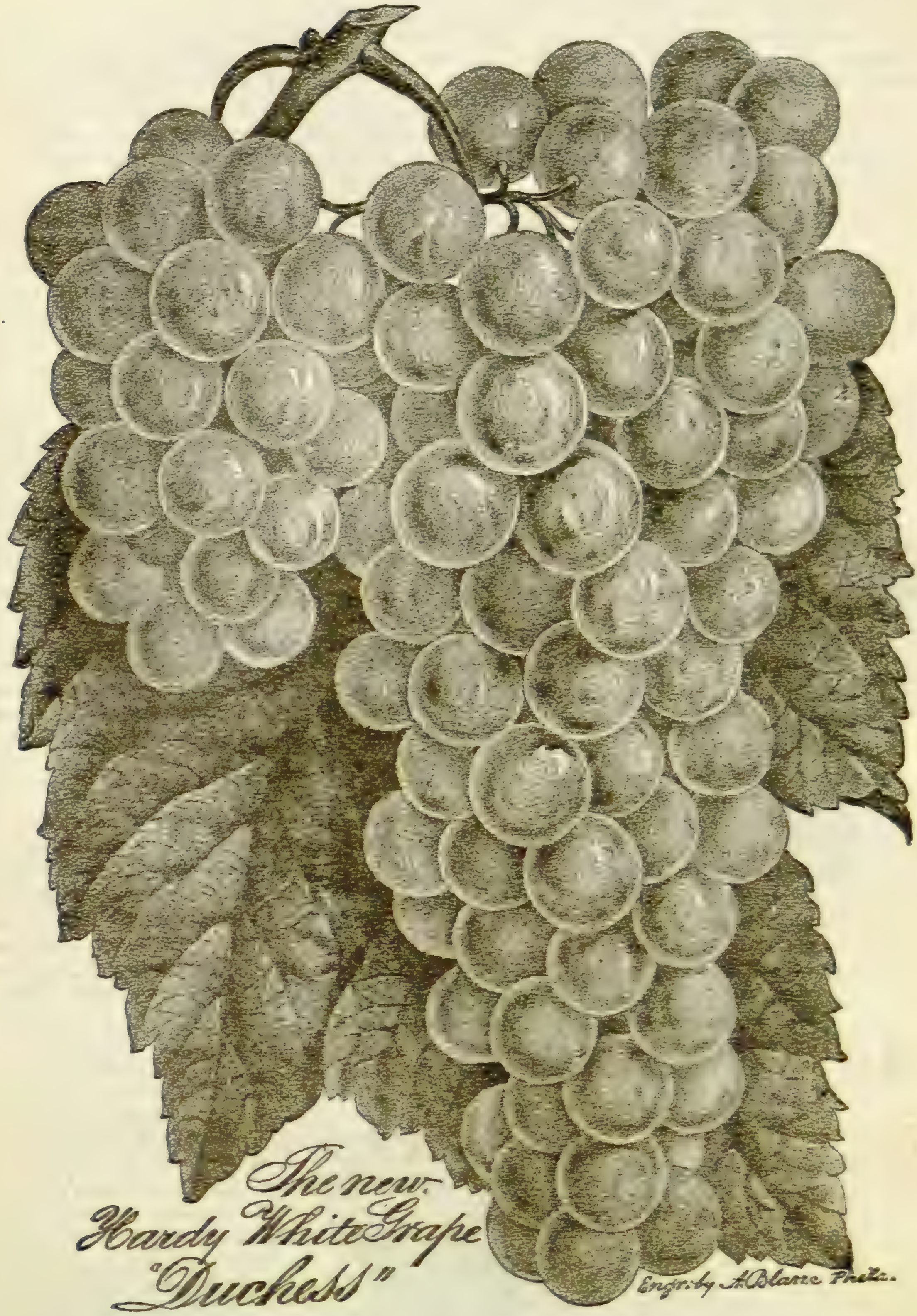
P. M. Augur of Connecticut, O. B. Hadwen of Massachusetts, and some others, consider it one of the best early varieties; a moderate grower, with a moderately good bunch. So far, it has not been tested in the west, and its parentage gives us no confidence in its value.

Early Hudson(?). An early, round, black grape, of little value, except as a curiosity, inasmuch as some of the berries contain no seed.

Elsinburgh. Syn., ELSINBORO, SMART'S ELSINBOROUGH. (*Æst.*) Supposed to have originated in Elsinburgh, Salem county, N. J. An amateur grape, of fine quality; ripens early. *Bunches* medium to large, rather loose, shouldered; *berries* small, round; skin thick, black covered with a thin bloom; flesh without pulp, sweet, vinous. Leaves deeply five-lobed, dark green, smooth; wood long-jointed and slender. Subject to mildew.

Elizabeth. (*Labr.*) Originated on the farm of Joseph Hart, near Rochester, N. Y., and described in the Rural New Yorker: *Bunches* large, compact; *berries* large, roundish-oval, greenish white with a purple tinge in the sun; flesh rather pulpy, acid.

El Dorado. Another of Ricketts' seedlings, produced by crossing Concord with Allen's hybrid. Vine partakes strongly of the parent Concord in every particular, while in fruit the bunch is very regular and much larger. *Berry* large, round, clear golden yellow with a thin white bloom, and few seeds. It is a *full sister* to the Lady Washington (between which there exists a strong resemblance), ripens early, and is perhaps the highest flavored grape, either hardy or *exotic*, in existence—possessing a delicate though decided aroma resembling pineapples; foliage and habit of growth good, so far as tested.—Not tested by us.



The new.
Hardy White Grape
"Duchess"

Engr. by A. Blanc Phila.

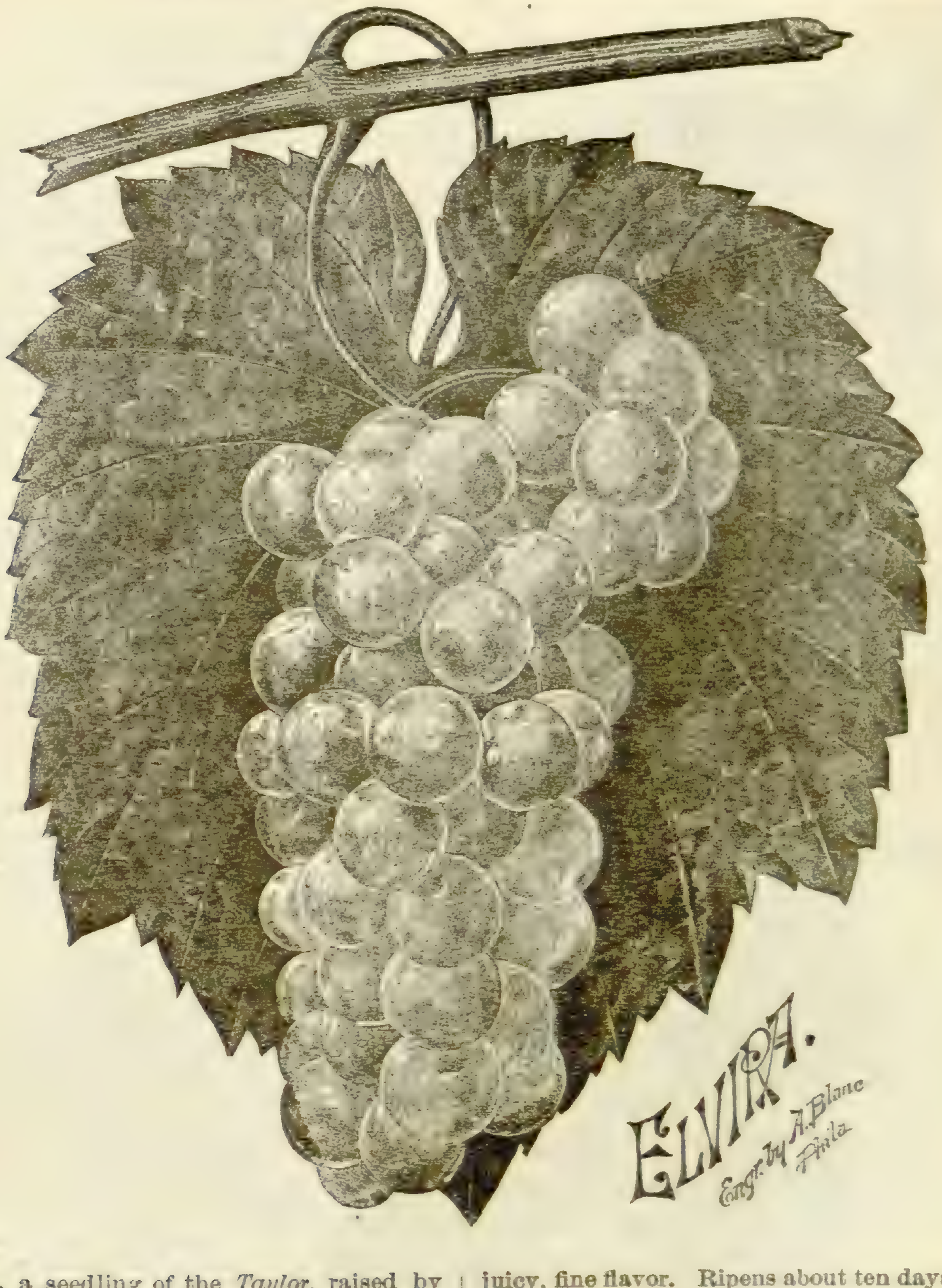
Early Victor. (*Labr.*) A chance seedling of the Labrusca class, originated with John Burr, of Leavenworth, Kansas, about 12 years ago (1871). *Vine* very hardy, healthy, vigorous, and very productive; *wood* dark gray, rather long-jointed; foliage thick, medium, dark green, deeply lobed, partaking somewhat of the character of the Delaware and Hartford Prolific—not as pubescent as the latter. The original vine has not been injured by the severe cold and sudden changes of our climate, and has shown no rot or disease.

"*Bunch* above medium, compact, often shouldered, sometimes double shouldered; *berry* medium, round, black with a heavy blue bloom; adheres to the peduncle until it shrivels; flesh slightly pulpy, juicy, sprightly, and vinous; agreeably sweet, without foxiness. *Season* at least a week EARLIER THAN HARTFORD PROLIFIC."—*Dr. J. Stayman.*

EARLY VICTOR.

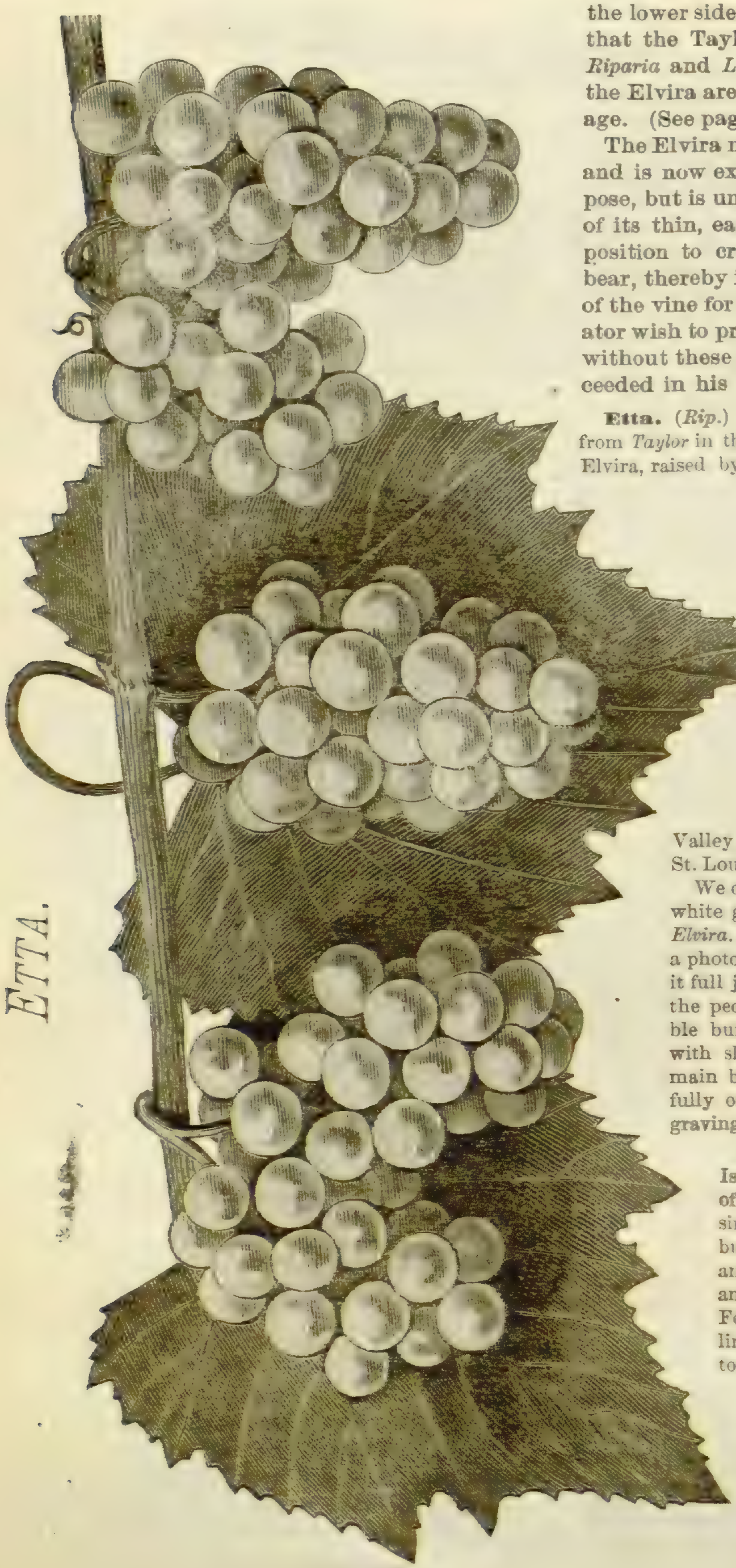
The above description is from the Third Appendix to Downing's "Fruits and Fruit-trees of America" (1881). This variety was not disseminated before the year 1881, but has been tested in various localities. Geo. W. Campbell says: "I know of no black grape so well fitted to take the place of all the foxy abominations (Hartford, Ives, Talman or Early Champion, Janesville, Belvidere) which have been tolerated on account of their earliness. I am glad to recognize in this variety a *really good, very early* black grape, with a vine evidently of the healthiest and hardiest type of the Labrusca class."

The Early Victor is expected to take a high position as a popular and profitable grape for the *market grower*, as well as for the vineyard and garden, wherever vines of the Labrusca class can be grown successfully. In growth and general habit, as well as in the size and general appearance of the clusters, it resembles the *Hartford*; but, unlike the Hartford, it is a grape of excellent quality, slight pulpiness, small seeds, free from foxiness, and the berry does not fall from the cluster even when overripe.



Elvira, a seedling of the *Taylor*, raised by Jacob Rommel, of Morrison, Mo., first introduced and disseminated by us in 1874–75, is now one of the leading white-wine grapes. The accompanying illustration was made for this Catalogue from a photograph of a medium cluster. *Bunches* small to medium, shouldered, very compact; *berry* medium, considerably larger than Taylor, its parent, round, pale green with white bloom, sometimes tinged with red streaks when fully ripe; skin very thin, almost transparent; it sets so very closely and the skin is so thin as to cause some of the berries to crack; pulp sweet, very tender and juicy, fine flavor. Ripens about ten days later than Concord.

Vine a most vigorous, stocky grower, eminently productive, often bearing four to six consecutive bunches from one eye; exceedingly healthy and hardy, having stood the hard winter of 1872–73, and even that of 1880–81, without protection. No rot to speak of, so far; foliage free from mildew in most unfavorable seasons. *Roots* like those of Clinton and Taylor, with the same immunity from attacks of the Phylloxera. Canes stout and long with well-developed laterals. Wood harder than the Taylor, with a medium pith. Foliage large



ETTA.

and strong, somewhat rusty and woolly on the lower side. Since it has been established that the Taylor is itself a cross between *Riparia* and *Labrusca*, the characteristics of the Elvira are fully explained by its parentage. (See page 20.)

The Elvira makes a very good white wine, and is now extensively grown for this purpose, but is unfit for marketing on account of its thin, easily-bursting skin. This disposition to crack and a tendency to overbear, thereby injuring the health and vigor of the vine for future years, made its originator wish to produce some still better grape, without these faults; and he may have succeeded in his "*Etta.*"

Etta. (*Rip.*) Understood to be a descendant from *Taylor* in the third generation, a daughter of Elvira, raised by Jacob Rommell (first exhibited in 1879 as Elvira Seedling No. 3); resembles Elvira, but has larger berries with firmer skin, not disposed to crack, and is superior in quality. It ripens later. The vine is of very vigorous growth with strong, healthy foliage, hardy, and productive. This grape was awarded the premium "for the best bearing Cane of New Seedlings for Wine, quality and productiveness to rule," at the Mississippi Valley Horticultural Society meeting in St. Louis, September, 1880.

We consider this *the best* of Rommel's white grapes, a great improvement over *Elvira*. The annexed illustration, copy of a photograph of this variety, may not do it full justice, as it was selected only for the peculiarity of often producing double bunches, or rather small bunches with shoulders equal in size with the main bunch; the natural size is also fully one-third larger than in the engraving.

Eureka. (*Labr.*) A seedling of Isabella, originated by S. Folsom, of Attica, Wyoming Co., N. York, similar to its parent in appearance, but claimed to be earlier, hardier and healthier, also of better flavor, and to keep better than Isabella. Folsom has since raised eight seedlings of the Eureka, which are said to be remarkable for earliness, fewness of seeds, and other good qualities. Unknown in the West.

Eva. (See Concord Seedlings, page 86.)

Empire State. (*Labr.* × *Rip.*) A new Seedling originated by JAMES H. RICKETTS from seed of the Hartford Prolific, fertilized with the Clinton. We have seen and admired both its beauty and excellence of quality at the Am. Pomol. Society's Exhibition at Boston, in 1881. The following letter of the originator to Geo. A. Stone, who bought the entire stock of this grape gives its description, and will otherwise be found interesting:

GEORGE A. STONE, Nurseryman, Rochester, N. Y.

Dear Sir: In regard to the Empire State, I will say that I believe it will satisfy a want which has long been felt—that of a good, very early white grape for home use as well as for market. The Empire State is a seedling of the Hartford Prolific fertilized with the Clinton; fruited for the first time in 1879, and its first crop was 38 bunches, which it carried through in fine order. Its crop of 1880 was 48 bunches of most magnificent fruit. Grafts inserted in two-year old vines in 1880 produced in 1881 from 20 to 30 bunches per vine, ripening with the Hartford Prolific and Moore's Early. Nearly all of the bunches shouldered, and the finest shade of white ever seen in fruit. A good grower and fruiter in every respect.

Bunches large, from 6 to 10 inches long, shouldered; *berry* medium to large, roundish-oval: color white with a very light tinge of yellow, covered with a thick white bloom; leaf thick, smooth underside; flesh tender, juicy, rich, sweet and sprightly, with a slight trace of native aroma, continuing a long time in use; vine very hardy. Its great productiveness, beautiful color, fine quality, extreme hardiness, vigor and healthfulness of vine and foliage, size and compactness of cluster, and good shipping qualities, *make it the best grape, all things considered, that I have yet produced.*

None of these vines have been disseminated, and consequently in making the purchase you have secured the control of the entire stock; and although it is true as you state, so far as I know, that $4,000, the price you have paid for it, is the highest price I have ever heard being paid for a new grape in this country, I consider it cheap at that price, and believe you will find it a profitable investment.

Very respectfully, JAMES H. RICKETTS.

Vines, young plants, of the Empire State will not be ready for distribution until the spring of 1884.

Essex. (Rogers' Hybrid No. 41.) *Bunch* of medium size, compact, shouldered; *berry* reddish black with blue bloom, round, somewhat flattened, in this respect resembling its native parent; flesh tender and sweet, with a high aromatic flavor. Ripens early, with Concord. Vine vigorous, healthy, and prolific.

EUMELAN.

Eumelan. ("Good black" grape.) (*Æst.*)* This variety was found as a chance seedling at Fishkill, N. Y., where it has been in cultivation (in the garden of Messrs. Thorne) for many years, yielding abundant crops of grapes, remarkable both for goodness and earliness. The original vines were purchased by Dr. C. W. Grant in 1866 (now Hasbrouck & Bushnell, Iona Island), from whom we obtained plants of this valuable variety. We give the description from the circular of its propagator, Dr. Grant, leaving out, however, all excessive praise, which, in our opinion, has damaged his success more than all his opponents. *Bunches* of good size, elegant form, and proper degree of compactness; *berries* large medium size, round, black with fine bloom, adhering firmly to the bunch long after ripening; flesh tender, melting, all going to wine-like juice under slight pressure of the tongue; ripening very

* By a mere typographical error in our first edition (1869) the Eumelan was designated as *Labr.*, and to our regret this error has ever since been copied and repeated by many others who ought to have known better.

early (even before the Hartford Prolific) and evenly to the center. Flavor very pure and refined, very sugary, rich and vinous, with a large degree of that refreshing quality that belongs distinctively to the best foreign wine grapes. *Roots* abundant, thick, spreading, and of medium toughness; liber thick but firm.

Vine a strong grower, producing remarkably short-jointed wood, with numerous and strong laterals; buds large and prominent; wood hard with a small pith; leaves large, thick, dark colored, firm in texture (it strikingly resembles Elsinburg), and, though subject to mildew in unfavorable seasons, we can recommend it as a very fine early grape.

The American Horticultural Annual for 1869 says of the Eumelan: "This variety has been tested in several localities. It has proved with us, near New York, remarkably healthy in foliage, and has taken several premiums as *the best black grape* at several exhibitions." Then again reports came from many localities, that it had failed to meet public expectations. In our vineyards at Bushberg, it has proved, in favorable seasons, all that was claimed for it, being early, productive, and of *very* fine quality; but, alas, unfavorable seasons came, and the Eumelans suffered severely from mildew, and since then they have not fully recuperated.

Perhaps with no other variety is it *so* important to set out only *good* and *strong* plants in the first place, as with this one; and we think that the great diversity of opinion now existing in regard to this grape is partly due to the fact that poor and feeble plants of this variety have been sent out which never came to any good thereafter, and never will do so.

The Eumelan makes a superior red wine (according to Mottier, North-East, Pa., must 93°, and at the test held at Hammondsport as high as 104°, with only 4 per mille acid).

We give a figure of a bunch and leaf reduced in size, and a single berry of full natural size.

Excelsior. (Hybr.) A seedling of the Iona fertilized with pollen of Vinifera, originated by Jas. H. Ricketts; first offered in autumn of 1882. The *vine* is moderately vigorous, short-jointed; *leaves* medium, moderately thick, lobed, coarsely serrated; *bunch* large to very large, shouldered, often doubly shouldered, moderately compact; *berry* medium to large, roundish inclining to oval, skin pale red, sweet, slightly vinous with a rich aromatic muscat flavor; the berries adhere well to the peduncle, and continue a long time in use. Ripens a little before the Catawba.

Ricketts says that this is the finest grape in his collection; that it withstood the winter of 1880–81 without any protection, but gives better results if protected. It is inclined to overbear, so much so, that every other eye of the fruiting-cane should be rubbed out; to produce bunches of the highest quality and beauty, the fruit should be thinned to one bunch to a shoot.

Faith. (*Rip.* ×) One of Jacob Rommel's very promising Taylor Seedlings. Vine a vigorous, healthy grower, sufficiently productive of long-shouldered medium size *bunches*; *berries* small to medium, white or pale amber colored; juicy, sweet, and purely flavored. Ripens very early, with or before the Hartford. Regarded by Rommel as one of his best varieties, and as not subject to mildew and rot.

Far West. (*Æst.*) The Nestor of Western grape culture, the late Frederick Muench (died in 1881), received from time to time grafts for testing of Mr. Herman Yaeger (Neosho, Mo.), who makes it his task to explore the forests of south-west Missouri for wild vines. Among these was a feeble graft which fruited after several years, and astonished him by the delicacy of the aroma of the wine made from same, so much so that he considered it the most valuable acquisition, one "likely to inaugurate a new era of viticulture." He honored it by the name "*Far West*," his own literary *nome de plume*.

Muench described it as follows: "Vine of most vigorous growth, with unusually large, healthy foliage, perfectly hardy, resisting (in my experimental vineyard) all diseases in the most unfavorable seasons. *Bunches* shouldered and of good size. *Berries* somewhat larger than Norton's; skin very tough, black with fine blue bloom. The pulp, or rather the flesh of its berries is soft, meaty, melting; is of dark rich color, with few seeds, very sweet and spicy; making a wine so mild, and yet at the same time fiery and aromatic, as to surpass (to *my* taste) all other known wines. Requires a long season, blooming and ripening its fruit very late, contemporaneously with Norton's;—wherever this standard variety succeeds the Far West may be confidently planted. Its propagation from cuttings seems almost impossible, but should be done by layering; the layers, however, not to be separated from the mother-vine until after the second summer."

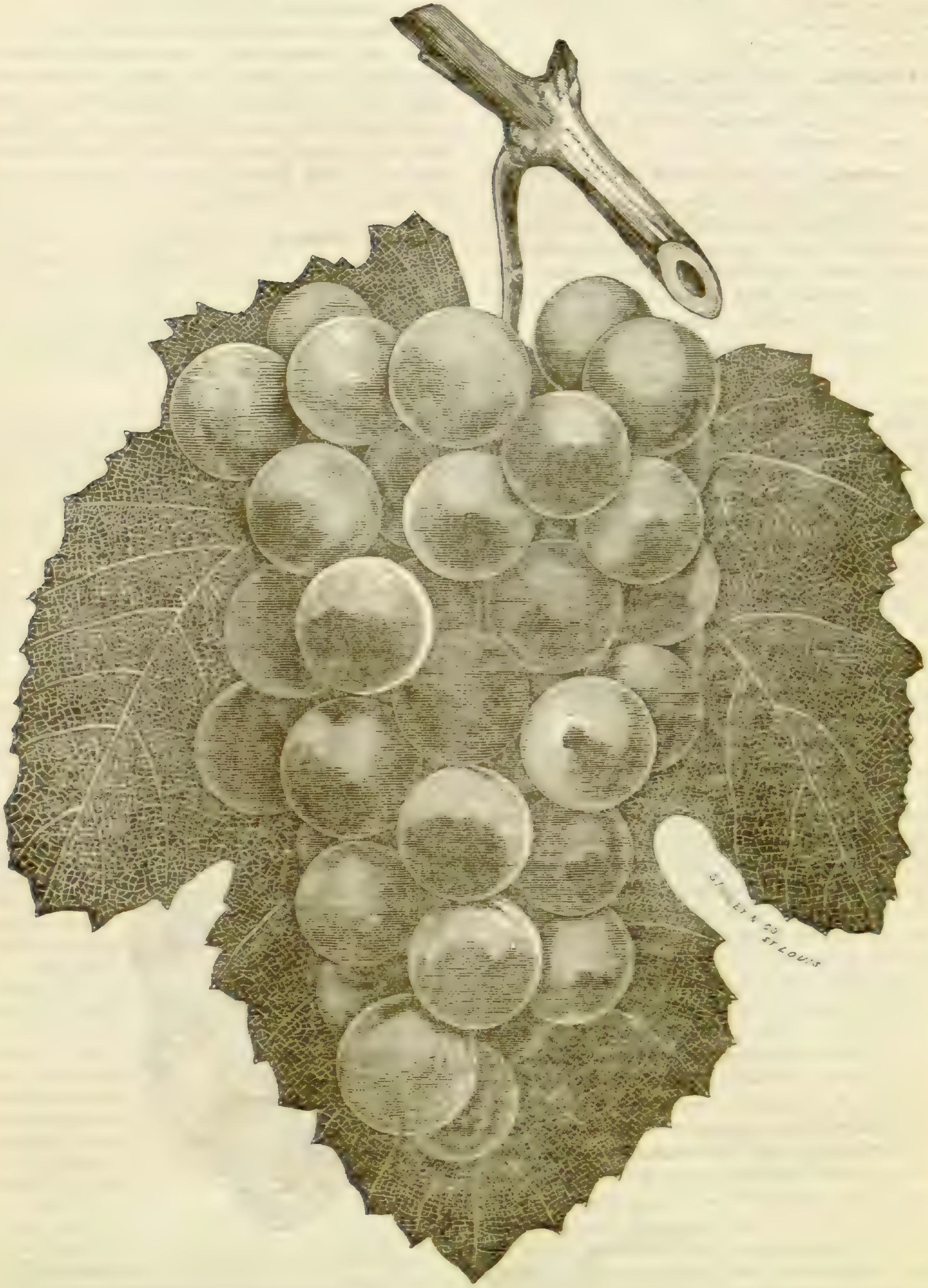
Flora. (*Labr.*) Origin Philadelphia, Pa. *Bunch* small, compact; *berry* small, roundish, oval, purplish-red. Flesh somewhat pulpy, acid at centre, juicy, vinous. Ripens about with Isabella. Vine hardy and productive.—*Downing.*

Florence. (*Labr.*) Probably a cross between Union Village *m.* and Eumelan *f.*, originated by Marine. A very handsome showy grape, of good quality; *bunch* large, with some of the Isabella character. Discarded.

Flowers. Syn., Black Muscadine. (*V. Rotund.*) A variety of the Scuppernong type. *Berries* large, growing in clusters of 10 to 20; black, sweet. Ripens very late; hangs upon the vine until frost. Said to make a rich, red, and delicious wine. Never fails to produce a crop, and perfectly free from any kind of disease. It is much esteemed (in Georgia, Alabama, and South Carolina) on account of its lateness, as it does not come in until the Scuppernong is gone.

Berckmans, of Georgia, says it is not quite as good as the Scuppernong and of about the same size.

Flower of Missouri. A Delaware seedling, grown by Wm. Poeschel, Hermann, Mo. Not disseminated, and probably never will be. It possesses both the excellence and the defects of "Walter."



GOETHE.

Framingham. Perhaps not identical with, but only a reproduction of, the Hartford Prolific—at least so closely resembling it that it should not have been introduced as a new variety.

Franklin. (*Rip.*) Vine has much the habit and growth of Clinton; not as good a bearer. *Bunch* small, not very compact; *berry* small, black, juicy, quite acid, austere; unworthy.—*Downing.*

Gaertner. (Rogers' Hybrid No. 14.) Hybrid between White Chasselas and a wild Labrusca. The Hon. Marssall P. Wilder described it as follows: *bunch* good size; *berry* medium to large; color light brown or red; skin thin; flavor pleasant and aromatic; season rather early; vine healthy and productive.

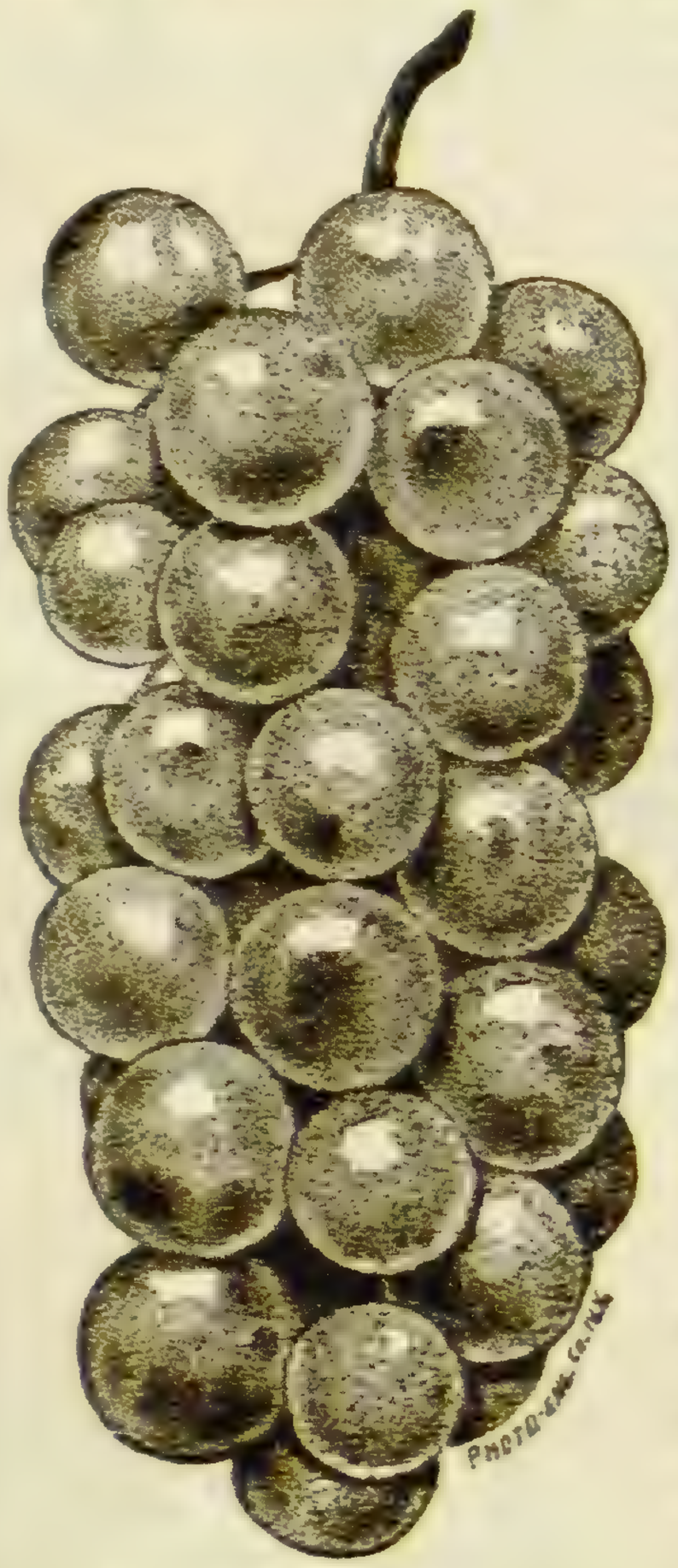
Gazelle. One of Rickett's hybrids, produced many years ago but neglected, and remaining unknown until about a year since. Sam. Miller, to whom he gave a plant or graft of this his almost forgotten child, says it is SPLENDID. *Bunch* large; *berry* about the size of Herbemont; color white or as nearly white as any grape could be, almost translucent; sweet and delicious. Its growth last summer pleased us very much.

Goethe. (Rogers' Hybrid No. 1.) This very valuable variety is, perhaps, more unique and shows in its fruit more of the character of the European species than any of Rogers' other sorts, and yet its vine is one of the hardiest, healthiest, and most productive we have. Late in ripening for northern localities, it does not always mature there; but here with us it produces and perfectly ripens a large crop of beautiful clusters and berries, free from imperfections of any kind, provided it has a good rich soil, and has not been permitted to overbear, which would ruin its health and productiveness for years to come, if not forever. A sandy soil seems also favorable for its continued health, as the *roots* of the Goethe, though thick—generally of a scraggy and warty exterior—are feeble, and in clayey soil may, perhaps, become a prey to the Phylloxera. The vine is a most vigorous grower, making stout and long canes, with well-developed laterals. Wood rather soft, with a moderate pith.

At the Fall meeting of the Mississippi Valley Grape-growers' Association, Sept. 9, 1868, we exhibited for the first time a few branches of the vine, each with several perfect clusters, which were much admired, and would probably have astonished the originator, could he have seen them. The smallest of them, being of a good average size, we had photographed, and an exact copy of it expressly engraved for this Catalogue. The *bunches* are medium to large, not quite compact, occasionally shouldered; *berries* very large, oblong, of a yellowish-green, sometimes blotched, with a *pale red* toward the sun and entirely red when fully ripe; skin thin, translucent; flesh tender and melting throughout; few seeds; sweet, vinous, and juicy, with a peculiar, delicious aroma. Specific gravity of must 78°; altogether a MOST DESIRABLE grape for the Middle Atlantic States, the Ohio and lower Missouri valleys, both for the table and for wine.

Golden Clinton. Syn., KING. (*Rip.*) A seedling from the Clinton closely resembling it, but with this difference, that its berries are greenish-*white*, and that it is far less productive. Campbell is perfectly correct in saying: "It does not sustain the character given by those who first introduced it. *Bunches* small, scanty, and irregular; *berries* small and of inferior quality. Not desirable."

Golden Drop. (Hybr.) A grape of recent introduction, described as an early white grape, raised by Pringle in 1869, from the Adirondac, fertilized by the Delaware. In size of bunch and berry it resembles Delaware. Col. yellowish-white, with a tinge of red when in the sun; *bunch* cylindrical, seldom shouldered, small, close; *berry* smallish, round; flesh tender, though slightly pulpy, juicy, very sweet and pure flavored, without the slightest foxiness. The vine is a good grower, yearly loaded with fruit; leaves small, obscurely lobed, tomentose beneath, showing superior capacity to resist mildew and thrips.



GOLDEN DROP. (Actual size.)

This purely native and hardy variety is admired by such as are fond of the sweet and delicate flavor of some of the foreign sorts. Its surpassing earliness makes it valuable for planting in our northern districts where none of the varieties in cultivation are sure to ripen thoroughly every year.—*Bliss & Son.*

Golden Berry. (Hybr.) A white seedling of the *Hartford Prolific* and *Gen. Marmora*, originated by Dr. Culbert, Newburg, N. Y.; hardy and a free bearer. Exhibited 1877. Not disseminated.

Golden Gem. (Hybr.) A seedling of the Delaware and Iona, a superb table grape, of golden color, produced by J. H. Ricketts; first exhibited at the Am. Pomological Society meeting in 1881, and first offered for sale in the autumn of 1882. Vine moderately vigorous; wood short-jointed; leaf small to medium, slightly serrated; *bunch* small and sometimes shouldered; *berry* small and of a rich golden color; flesh tender, juicy and rich, with a fine rose flavor; quality best. The fruit ripens very early, even before Hartford Prolific, and continues a long time in use without losing any of its good qualities. Wherever either of its parents, the Delaware or the Iona, can be successfully grown, this superior novelty deserves special attention and trial.

Graham (?). An accidental seedling, introduced by Wm. Graham, of Philadelphia; *bunch* of medium size, not compact; *berry* half an inch in diameter, round, purple, thickly covered with a blue bloom, contains little or no pulp, and abounds in juice of agreable flavor. A poor grower and bearer.—*Downing.*

Grein's Seedlings. A lot of Taylor Seedlings raised by Nicholas Grein, near Hermann, Mo., and by him supposed to have been produced from seed of the European Riesling which he had sown:

No. 1—Missouri Riesling.* *Vine* hardy and very healthy; a moderate grower, comparatively short-jointed; with healthy, thick leaves; very productive. *Bunch* medium, moderately compact, slightly shouldered; *berry* medium, round, greenish-white, but light red when fully ripe; very tender pulp, juicy, sweet, of fine quality, making an exquisite white wine; and on this account it is now largely planted by the wine-growers of Missouri and Illinois. Ripens ten days after the Concord. Subject to rot in wet seasons.

No. 2—Grein's Golden. Somewhat similar to the former, but a stronger grower; *bunch* medium, not very compact, handsomely shouldered; *berries* larger than most other Taylor seedlings, of a deep yellow golden color, bronzy toward the sun; sweet, juicy, with little pulp. Ripens with Concord. A very promising grape for family use, table, and market.

No. 3—much resembles his Missouri Riesling in bunch and berry; said to contain more sugar and to make a still better wine.

No. 4—also resembling the former, and said to make a very fine wine of a deep golden color and delightful flavor.

No. 7, or Grein's *extra early*. Vine a vigorous grower, moderately productive; bunch and berry resembling Delaware in size and shape but not in color, which herein is a beautiful greenish-yellow, with a distinct star-like speck on each berry. Ripening about same time as Concord.

Hartford Prolific. (*Labr.*) The standard for earliness among grapes. Raised by Steel, of Hartford, Conn., over thirty years ago. It is well-known, and generally planted as a very prolific early market variety; ripens here early in August, about ten days in advance of the Concord; but as soon as ripe it generally drops its fruit, and is of poor quality. The vine is very healthy and hardy, and produces immense crops. *Bunches* large, shouldered, rather compact; *berries* round, full medium, black; flesh pulpy, juicy, with a perceptible foxy flavor; *roots* very abundant, branching and fibrous, of average thickness and toughness, and tolerably firm liber. Canes stout, with strong crooks at the joints, laterals well developed, and having considerable down on the young growth. Wood hard, with a small pith. Wine has also been made from it, but it could not be recommended by us for that purpose. Only as a market grape is it considered valuable by some, on account of its earliness and great productiveness, but even as such it is inferior to several others.

Framingham and Seneca are almost identical with Hartford; the Pioneer is also similar to it, but considered as a better grape in all respects. N. H. Lindley, of Bridgeport, Conn., says, "we have discarded the Hartford and grow the Pioneer in its place." Let all grape-growers discard the Hartford, which only destroys the appetite for grapes, and thus injures the sale and price of all sorts; while a *really good* very early market grape would increase the demand for all later varieties.

Haskell's Seedlings. Of the very large number of hybrids produced by the long-continued and expensive labors of George Haskell, of Ipswich, Mass., he has selected forty varieties, designated by numbers only, which he offered for sale in 1877; but as he would not sell less than thirty vines to any one grape-grower or nurseryman at a price which, though low, considering their cost to the originator, yet exceeds the ability of most grape-growers,—and as they are all hybrids between the *foreign* (Black Hamburg, White Frontignan and White Chasselas) and native (the Black-fox, Amber-fox and Pigeon), and had not been tested in other localities, very few of them have been distributed.

Our proposition to take five of these varieties, two plants of each kind, for trial, and to pay for them at the rate asked for the 30 vines, was declined, although Haskell says himself in his very interesting "Account

* Pronounce: *Reesling.*

of various Experiments for the Production of new and desirable Grapes," published by himself, that it cannot be desirable to propagate so many varieties in any locality. Thus the results of his long and meritorious labors will probably forever remain in obscurity: and while a pecuniary recompense was not, fortunately for Haskell, "by any means a matter of necessity" with him, it is to be regretted that the results he obtained, which might have been a benefit to the public and of value to this country, were thus lost. The fruit committee of the Amer. Pomological Society, and other authorities to whom Haskell sent some of these grapes for judgment, pronounced several of excellent quality.

Harwood. (*Æst.*) Syn., *Improved Warren;* obtained from Major Harwood, of Gonzales, Tex.; similar to Herbemont in every respect except size of berry, which is nearly double the size of that of Herbemont; it also varies in color, sometimes being no darker than Diana; ripens four or five days earlier than the Warren or Herbemont. It originated in the garden of Colonel Harwood, at Gonzales, Texas. This grape has short-jointed heavy canes, is not as rank a grower as Herbemont, and does not grow readily from cuttings.

Hattie or **Hettie.** There are three grapes under this name, or under conflicting descriptions. One originated with Mrs. N. R. Haskel, Monroe, Mich.; described as a bright, clear red, translucent grape; the other, introduced by E. Y. Teas, of Richmond, Ind., as a large, oval, black grape—"earlier, larger and better than Concord and Isabella"; and another of unknown origin. *Bunch* small; *berry* black; flesh somewhat pulpy; a poor grower and bearer, but ripens early. All three are here unknown.

Herbemont. Syn: WARREN, HERBEMONT'S MADEIRA, WARRENTON, NEIL GRAPE. (*Æst.*) Origin unknown; as early as 1798 it was propagated from an old vine growing on the plantation of Judge Huger, Columbia, S. C. Nicholas Herbemont, an enterprising and enthusiastic cultivator of the grape, found it there, and from its vigorous growth and perfect acclimation at first correctly supposed it to be a native; he afterwards, in 1834, was informed that it had been received from France, and he believed this. But the same grape was also found growing wild (? in Warren County, Ga., and is there known as the Warren grape. The best authorities now class it as a member of the Æstivalis family of the south—a native grape, truly called by Downing, "Bags of Wine." One of the very best and most reliable grapes for both table and wine, especially adapted for hill-sides on limestoue soil. It flourishes in Texas, Georgia, South Carolina, and Florida, but generly only on poor hill-land Should not be planted further north than the Ohio and lower Missouri river, and even there should be covered in winter. For those who have gone to this trouble it has nearly always produced a splendid crop, and has been so enormously productive that it richly repaid the little additional labor, except where rot destroyed the crops, and it may be mentioned that the rot on the Herbemont and its family is different from the rot which attacks the Labrusca. To some of our Southern States this grape will be a mine of wealth. In southern Texas, where the Herbemont is a perfect success, grape culture is gradually but steadily extending, so that, at no distant future, vine-culture will become one of the leading industries of its people. M. Lespiault reports: "Le vin de l'Herbemont fait en blanc est excellent et peut rivaliser avec les vins blancs de nos meilleurs crûs." At the exposition of the international Congress at Bordeaux, Oct., 1881, M. Lepine exhibited a Herbemont vine, whose two arms had forty bunches on the one and sixty bunches on the other, all perfectly ripened. The sight of this superb and immensely productive sample made many converts of former opponents of the American vine. *Bunches* very large, long, shouldered and compact; *berries* small, black, with a beautiful blue bloom; skin thin, flesh sweet, without pulp, juicy and high-flavored; ripens late, a few days after Catawba. *Roots* of medium thicknes, with a smooth, hard liber, resisting to the Phylloxera in France as well as here. Canes stout, heavy and long; laterals well-developed. Wood hard, with a medium-sized pith, and firm outer bark. Vine a very vigorous grower, with the most beautiful foliage; not subject to mildew, and but little to rot; in rich soil it is somewhat tender, makes too much wood, and seems less productive, while in warm and rather poor limestone soil, with southern exposure, it is generally healthy, and enormously productive, except in very unfavorable seasons, when all half-tender varieties fail. Werth, of Richmond, Virginia, says: I have found the most uniformly abundant, healthy, and thoroughly ripened crop, for successive seasons, on low, imperfectly drained, and rather compact soil. Eisenmeyer, of Mascoutah, Ill., finds summer pruning, promptly performed at the close of the flowering season, very effective in preventing rot and in securing a fine crop of Herbemont grapes. The accompanying illustration gives an idea of the beauty and richness of the bunch. Specific gravity of must about 90°. The pure juice pressed, without mashing the grapes, makes a *white* wine, resembling delicate Rhenish wines; if fermented on the husks about forty-eight hours, it will make a very fine pale red wine. The French wine-judges at Montpellier, pronounced it "assez agréable, rappellant le gout des vins de l'est de la France."

THE HERBEMONT GRAPE.

It seems that but very few seedlings of the Herbemont have been raised; at least we know of none that were disseminated. One Herbemont seedling is mentioned by Dr. Warder in his description of the "Longworth School of Vines." The *Pauline* (see description) may by a seedling of Herbemont, as also the *Kay's* Seedling, from Kentucky, and the *Muskogee*, but little is positively known of these varieties.

The *McKee* was looked upon as a Herbemont seedling, with fruit larger than Herbemont and bearing about a week earlier, but now, after careful comparison, it is pronounced as identical in every point with Herbemont. Onderdonk does *not* pronounce it to be the Herbemont itself, showing some difference between the two, such as by starting later in spring; but even if this difference were permanent, and not produced by local circumstances or conditions of soil, it would not be sufficient to make it a distinct variety.

If WE intended to raise new seedlings (which we do *not*), we would select the Herbemont as one parent in preference to almost any other variety.

Hayes. Syn., FRANCIS B. HAYES — formerly Moore's No. 31. (*Labr.*) This is out of the same lot of seedlings as the Moore's Early. It is a very early white grape, raised by John B. Moore, of Concord, Mass.; smaller than Martha, but better in quality; was awarded a first-class certificate of merit by the Mass. Hort. Society, Sept. 14, 1880. *Vine* claimed to be hardy and a vigorous grower, prolific, free from mildew: "wood short-jointed; *bunch* longer than Prentiss, moderately compact, partly shouldered; *berry* medium, globular, with a fine amber-yellow color; *skin* very firm; *flesh* tender, juicy, of a delicate texture and fine flavor, free from all foxiness. Ripens from 7 to 8 days before Concord, yet holds its leaves after those of most other varieties are killed with frost."

THE HAYES (OR FRANCIS B. HAYES).

This new white grape will be offered for sale for the first time in the fall of 1884, although it was first fruited in 1872, and was first exhibited in 1874 at Boston, where it has attracted special notice for excellent quality and earliness. The originator now introduces it with the following remarks: "It is our endeavor to place before the fruit growers of the country, a grape of quality, possessing certain desirable and distinct characteristics which are rare exceptions in grapes of this class. This grape is a *pure native*, possessing hardiness and vigor to a degree seldom attained by other white varieties, and especially adapting it for cultivation in *northern and eastern sections*."

"It seems proper at this time to offer a word of warning to purchasers of new varieties of fruits, etc. Since 1876 thousands of vines of the Concord have been sold throughout the country for the Moore's Early.

"The like thing was done at the time of the introduction of the Worden, and such has been the case with other new varieties of fruits, and undoubtedly *will occur hereafter*.

"Therefore it is absolutely necessary that purchasers, to avoid disappointment, should send directly to the introducer for new fruits, or else to long-established and reliable nurserymen."

Hermann. (*Æst.*) A seedling of Norton's Virginia, raised by F. Langendoerfer, near Hermann, Missori. In 1863 the original vine fruited abundantly with its originator, and grafts of it bore a large crop in 1864. It has been fully tested in various places & proved as to growth, foliage and fruit. On trying the must on Oechsle's scale it showed 94° to 105°. *Bunch* long and narrow, seldom shouldered, compact, often nine inches long; the shoulders, if there are any, having the appearauce of a second bunch; *berry* small, about same size as Norton's, round, black with blue bloom, moderately juicy, rarely rots or mildews, and ripens very late, several days later than the Norton's. The juice is of a brownish-yellow, making a wine of the color of Brown Sherry or Madeira, of great body, and of fine flavor; satisfactory in the south central States. Our friend Sam. Miller says: There is a peculiar fragrance about the wine of the Hermann that no other American grape possesses; and, were I a teetotaler in drinking, I should like to have wine of it just for the pleasure of smelling it." The French judges at the Congrès Montpellier pronounce the Hermann "bien droit de goût, particulièrement bon et corsé."

THE HERMANN GRAPE.

Vine a strong grower and very productive, resembling the Norton's in foliage; but the leaves are of a lighter color, the stems covered with peculiar silvery-white hair-like threads, and the leaves somewhat more deeply lobed.

Highland.

It is, like its parent, very difficult to propagate from cuttings in the open ground. *Roots* wiry, very tough, with a smooth, hard liber, defying all attacks of the Phylloxera. Canes of medium thickness, great length and vigor, and a moderate number of laterals; the canes often branch off with a fork, having a double bud at the base—a freak of more frequent occurrence with this, than any other variety we know of. Wood very hard, with a small pith.

The Hermann was considered an important addition to our list of *wine grapes*. If productiveness, general hardihood and health, can entitle a variety to consideration, this variety certainly deserves it at the hands of our vintners. Its wine is entirely different and distinct from anything else we have; but the prediction "that it will produce a true American sherry, equal if not superior to anything the old world can produce," has proven idle talk and bombast. So far the *Hermann* has not grown in favor or popularity, and it will never be extensively planted.

For our locality and farther south it may be desirable, but much farther north it will hardly attain the perfection requisite to make a superior wine, as it ripens so very late. It will be found specially adapted, we think, to southern slopes and limestone-soil. It is a true Æstivalis in leaf and habit.

Langendoerfer has also raised a *white seedling of the Hermann*, which is very vigorous and productive, resembling its parent in growth, and in form of bunch and leaf; the latter, however, is of lighter green. It is one of the *first* of that class (Æstivalis) with WHITE berries. The wine made from this variety is as excellent in quality as the grape is remarkable for its color. Some good judges who tasted the wine said, "it is exceedingly smooth and fine, in bouquet plainly showing Hermann origin."

The originator does not intend to disseminate this new variety, and has not decided upon a name for this grape, as the *very* small size and very late ripening of its berries would be unfavorable to its introduction. In south-west Missouri and Arkansas, however, it seems to have given satisfactory results, and H. Jaeger, of Neosho, is now propagating it.

Herbert. (Rogers' No. 44.) Labrusca impregnated by Black Hamburg. This is probably *the best* of the black varieties of Rogers. Among all the hybrids none proved of greater merit than this one. The vine is very vigorous, healthy, and hardy; *bunch* large, beautifully shouldered, rather long, and moderately compact; *berry* large size, round, sometimes a little flattened, black; flesh very sweet and tender, purely flavored and free from coarseness or foxiness either as to the taste or smell. Early and productive.

Campbell says: "It has so many good qualities, it should be better known and more extensively planted both for home use and for a showy and excellent market grape. If I were asked to name another black grape, hybrid or native, that I consider equal in all respects to the *Herbert*, I could not do it!"

Highland. (Ricketts' No. 37.) One of the largest and finest looking of Ricketts' Seedling Grapes; a hybrid produced by fertilizing the Concord with Jura-Muscat; resembling the Concord in vine and foliage. A vigorous grower, with short-jointed, dark brown wood; large, thick, coarsely serrated leaves, and very productive. *Bunch* large, long, moderately compact and heavily shouldered; well-grown clusters sometimes weigh one pound. *Berry* large, round, black with a thick blue bloom; flesh soft, slight pulp, juicy, sweet, slightly vinous, and very good. *A promising market grape.* Ripens between Concord and Catawba.

Its foliage has so far been free from mildew, and, considering the superior quality and beauty of this grape, it is justly regarded as one of the most promising hybrids.

Hine. *Labr.*) A seedling of the Catawba, raised by Jason Brown (son of John Brown, the abolitionist), at Put-in-Bay, Ohio. It makes a good sized, compact, slightly shouldered *bunch; berry* medium, of a dark rich claret brown with a purplish bloom; skin of medium thickness; flesh juicy, sweet, and almost without pulp; leaf large, thick, and whitish underneath; canes reddish-brown, short-jointed; buds prominent. Ripens with the Delaware, which it somewhat resembles. It took the first premium as the best new seedling at the Ohio State Fair, 1868. We cannot recommend it except as an interesting grape to amateurs.

Holmes. A new chance seedling (*Hybr.*) which appeared in a garden in Galveston, Texas. Onderdonk kindly furnished us with the following description of this grape for the Bushberg Catalogue: "The Holmes combines, in its growth and appearance, both *Æstivalis* and *Labrusca* blood. Its fruit is about the size and color of Lindley. I believe it to be a cross between the Southern Æstivalis of the Herbemont Division and a Labrusca, and that it will, possibly, combine the hardiness of our Æstivalis with the pulp of the Labrusca"—just the combination we have been looking for. The original vine is enormously productive and has been so for many years. It has not, so far, been propagated.

Howell. (*Labr.*) Origin unknown. *Bunch* and *berry* medium; oval, black; skin thick; flesh with firm pulp, pleasant. Good. Middle of September.—*Downing.*

Huber's Seedlings. T. Huber, at Rock Island, Ill., an amateur grape-grower, has sent

us a number of new grapes, of fair quality, said to be perfectly hardy and good bearers; he named them Margerith (No. 6), Illinois City (No. 8), and Braendly (No. 14).

Humboldt. (*Rip.* ×) A very interesting seedling of the Louisiana, raised by Fr. Muench, who observed himself that it has no resemblance to Louisiana; it has much more of the Riparia character, and most probably is an accidental cross between a Louisiana and some belated Riparia blossom. *Vine* of very vigorous growth, healthy and hardy, free from rot or leaf blight; *bunch* below medium; *berries* medium, of light *green* color, changing to a rose-tint, almost like Delaware, when fully ripe and exposed to the sun. It is sufficiently productive and of fine quality.

IRVING.

Huntingdon. (*Rip.*) A grape of the Clinton class. *Bunch* small, compact, shouldered; *berry* small, round, black, juicy and vinous. Ripens early. Vine a vigorous grower, healthy, hardy and productive, but unworthy of propagation.

Hyde's Eliza. See "York Madeira."

Imperial. (Hybr.) A white seedling from Iona and Sarbelle-Muscat, by Ricketts, of Newburgh, N. Y. *Bunch* large with slight shoulder; *berry* very large, white with considerable bloom; no pulp; no seeds(?); splendid flavor with traces of the Iona-Muscat aroma. Vine a vigorous grower, hardy; ripens about time of the Isabella. The finest white grape of Ricketts' collection, according to Williams, editor *Horticulturist*.

Irving. (Underhill's 8–20.) (*Hybr.*) A fine, most showy and attractive white grape, grown from Concord seed crossed with White Frontignan, which was planted by Steph. W. Underhill, of Croton Point, N. Y., in the spring of 1863; fruited first in 1866.

The character of the very large cluster is seen by the engraving (about one-half reduced in size). The berry is large, considerably larger than Concord, of a yellowish-white color, slightly tinged with pink when very ripe. The vine is a moderately vigorous grower; has large, thick foliage, with "down" on the under-side. Fruit ripens rather late, between the Isabella and Catawba, and keeps well in winter; it has a vinous flavor, and is quite fleshy when perfectly ripe. We consider this far more deserving of dissemination than his "Croton."

Isabella. Syn., Paign's Isabella, Woodward, Christie's Improved Isabella, Payne's Early, Sanborton(?). (*Labrusca.*) Probably a native of South Carolina. About the year 1816 it was brought to the north and introduced to the notice of cultivators by Wm. Prince, who obtained it from Mrs. Isabella Gibbs, in honor of whom it was named. In the East, its great vigor, hardiness, and productiveness have caused it to be widely disseminated, but in the West it was found to ripen unevenly, and to be very liable to mildew, rot and leaf-blight. It has justly, we think, been discarded by our western grape-growers since better and more reliable varieties have taken its place. *Bunches* large, loose, shouldered; *berries* oval, large, dark purple, nearly black when fully ripe, and covered with a blue-black bloom. Flesh juicy, with a rich, musky aroma; tough pulp, and a great deal of acidity. Ripens irregularly, and the leaves seem to fall just at the time when they are needed to aid in ripening the fruit.

In *some* localities it is still a favorite market grape. Must at Hammondsport 60°–79°; acid 12½ to 8 per m.

The *Isabella* has a host of children, few of whom, it seems, have survived her. Those of her seedlings which acquired some repute are described under their proper names in this Catalogue—see *Adirondac*, *Eureka*, *Hyde's Eliza*, *Israella*, *Mary Ann*, *To-Kalon*, *Union Village*.

Many of her seedlings differ so little in form, size, or quality of fruit, in growth and productiveness (some differ only in name), that we prefer to class them as sub-varieties. They are *Aiken*, *Baker*, *Bogue's Eureka*, *Brown*, *Cloanthe*, *Carter*(?), *Hudson*, *Louisa*, *Lee's Isabella*, *Payne's Early*, *Pioneer*, *Nonantum*, *Sanbornton*, *Trowbridge*, *Wright's Isabella*, &c.

Iona. Originated by Dr. C. W. Grant, of Iona Island, near Peekskill, N. Y. It is a seedling of the Catawba, and the leaf somewhat resembles that variety. Wood soft, short-jointed, with a pith above average size; vine a strong grower, but not very hardy; *roots* very few, straight, of medium thickness, and of no very firm texture. Canes straight, not inclined to ramble, and of medium thickness, with few laterals. Here it is subject to mildew and rot, and requires careful protection in winter.

The Iona is a fine grape for the garden, and suited only to specially sheltered and protected localities; it requires rich soil and good cultivation; in regions which are not subject to mildew (or leaf-blight, as it is sometimes called), the Iona will yield a fine crop of large, splendid and well-developed clusters, especially when trained against buildings. We are sorry to know that in open-field culture it does not ripen uniformly, and in some years entirely fails, in many localities. Wherever it will succeed, it is a most desirable variety, also for the vineyard.

Bunch usually large, long, and shouldered, not very compact; *berries* medium to large, slightly oval; skin thin, but tenacious; pale red, with numerous deep red veins, which become quite dark when fully ripe; fine bloom. Flesh tender, with uniform character and consistence to the centre. Flavor rich, sweet, vinous; quality BEST, equalling the Delaware. Ripens with or a few days after Concord, continues a long time in use, and does not deteriorate in keeping as most other grapes will; with proper care it can be kept until spring, and still be good. Magnificent specimens were grown in a cold-house by Saunders, at the Experimental Gardens at Washington. *Must* 88° to 92°, and some recorded as high as 101°; acid $6\frac{6}{10}$.

Iowa-Excelsior(?). Raised by Prof. Mathews, of Iowa, six or eight years ago. Sam. Miller describes it to us as "a LARGE RED grape, fair-sized bunch, ripens before Concord, and to my taste as good as Rogers No. 15 (Agawam), which it slightly resembles." This grape might become valuable for the West, and we are surprised that no effort has been made to introduce it.

Israella. Originated with Dr. C. W. Grant, who claimed for it that it was "the earliest good grape in cultivation"; but later he himself admitted that it was not as good as his "Eumelan." With us it proved later than Hartford Prolific. Vine a moderate grower; foliage subject to mildew; *bunches* large, shouldered, compact, and very handsome when well ripened: *berry* black with beautiful bloom, rather large, slightly oval, pulpy, not above second-rate in quality. It is now generally discarded.

The Israella is probably a seedling of the Isabella, which it resembles in habit of growth and character of fruit.

Ithaca. A *Hybr.* seedling, raised by Dr. S. J. Parker, Ithaca, N. Y.; described by its originator as larger than Walter in bunch and berry; a pure greenish-yellow; a rose-like smell, a high, Chasselas-Musque-like flavor, and claimed to be a cross of Chasselas on Delaware, ripening before Delaware. Said to be hardy, healthy and vigorous. Not disseminated. We only place it on record as one of the new varieties likely to be brought forward.

Ives. Syn., IVES' SEEDLING, IVES' MADEIRA, KITTREDGE. (*Labr.*) Raised by Henry Ives, of Cincinnati (probably from the seed of a Hartford Prolific, certainly not from a foreign grape as supposed). Col. Waring and Dr. Kittredge were the first to make wine from it—about eighteen years ago (1865)—and now it is a popular red wine in Ohio. While we do *not* deem it entitled to the first prize "as the best wine-grape for the whole country" (awarded to the Ives at Cincinnati, Sept. 24, 1868), we do accord to it the great merit of having given a new impulse to grape-growing in Ohio, at a time when the repeated failures of the Catawba vineyards made it most desirable that a more reliable and productive grape should be introduced.

Bunches medium to large, compact, often shouldered; *berries* medium, slightly oblong, of a dark purple color, quite black when fully ripe. Flesh sweet and juicy, but decidedly foxy, and rather pulpy. Not desirable as a table grape, being of very poor quality, but nevertheless a popular market grape, as it bears transportation better than most other kinds.

It colors very early, but its period of ripening is later than the Concord. The vine is remarkably healthy and hardy; generally exempt from mildew and rot; a strong, coarse grower, in general habit and appearance closely resembling the Hartford Prolific. *Roots* abundant,

THE IVES GRAPE.

thick-spreading, and of tolerably hard texture. Liber thick but firm; pushes new spongioles rapidly and offers good resistance to the Phylloxera; it nevertheless did not succeed at all in southern France. It does not seem to be an *early* bearer, four-year old vines of this variety producing the first crop; however, it bears profusely when older. The Ives wine has a most beautiful deep red color, but a foxy taste and odor. Must 80°.

Jaeger's selected Æstivalis varieties. Fifteen years ago, Herman Jaeger, of NEOSHO, southwest Missouri, sent to Frederick Muench some grafts of V. Æstivalis which he had selected from among those growing wild in that region. Encouraged by the favor with which our late friend Muench viewed them (especially the NEOSHO and the FAR WEST), and desirous of finding or producing some superior varieties of this hardy and healthy class of grapes (belonging to what we call the *northern group of V. Æstivalis*), Jaeger continued to select some wild vines remarkable for their quality or size, and to cultivate them, as also to grow vines from their seed. They are as yet only designated by numbers; and he has kindly furnished us (Aug., 1883) the following brief notes on those which he considers the most promising:

No. 9—bunch large; berry below medium, fine, juicy, pure sweet; very prolific; rots in sultry weather.

No. 12—medium sized bunch and berry, very sweet, with a peculiar, very fine flavor; fruit healthy, so far.

No. 13—size of bunch and berry like *Ives;* a marvel of health and productiveness; fruit of peculiar flavor and *not* pleasant to eat, yet, with same treatment that will make a fair wine from Concord grapes, a decidedly better wine can be produced from this (No. 13).

No. 17—bunch large; berries medium, good, sweet, and healthy.

No. 32—bunch and berry of medium size, very sweet, healthy; dark brown wine, of Sherry character.

No. 42—bunch of Norton size, berry larger; best in quality; very sweet, and juicier than most Æstivalis, with a delicious vanilla-like aroma. The finest flavored grape I know; productive and healthy.

No. 43—bunch and berry of Concord size; very productive and healthy; may prove a valuable wine and market-grape.

No. 52—of still larger size; promising.

H. Jaeger, in a letter to V. Pulliat (July, 1883), writes that he also cultivates some hybrids of *Cordifolia* crossed with *Rupestris;* and that he succeeded in crossing the wild *Æstivalis* with *Rupestris*, which promises some meritorious varieties. He thinks that by crossing the sweet *Cinerea* with a well-selected *Rupestris*, a grape could be produced which, though small in size of the berries, would be good enough in quality to satisfy even the European taste, and at the same time would be perfectly resisting to the Phylloxera.*

We wish him best success.

Jacques. Syn., *Jack, Black Spanish* (*Ohio, Cigar Box,* &c.) **See LENOIR.**

Janesville. (*Labr.* × *Rip.*), by some supposed to be a cross of Hartford and Clinton.) An early black grape, largely planted in Iowa and Wisconsin, but now generally discarded for better varieties. *Vine* a vigorous grower, hardy, healthy, and productive; *bunch* medium, compact; *berry* medium to large, black; skin thick; flesh pulpy; quality about like Hartford; colors even earlier than this variety, but fully ripe at about same time.

* M. Marès, a distinguished member of the French Phylloxera Commission, reports that among his Rupestris he found one which the third season produced 1 kil. grapes, of magnificent color, ripe on the 2d of August, the must of which had an excellent taste, weighing 11° Beaumé (83° Oechsle) scale, and made a very good wine. This variety may become the starting-point for many interesting seedlings or hybrids; it is of remarkably vigorous growth and unharmed by Phylloxera. The fibrous roots of the Rupestris are long and strong, and defy drought even in less than ordinary soils.

Jefferson. (*Labr.* ×) This new, handsome, and excellent red grape was raised by James H. Ricketts, Newburgh, N. Y. It is a cross between the Concord and Iona. The foliage seems strong and healthy, not liable to mildew; the vine is vigorous in growth and very hardy; wood rather short-jointed; leaves large, thick and downy; said to be very productive.

Bunch large, shouldered, sometimes double-shouldered, compact; *berry* above medium, roundish-oval; skin rather thick; LIGHT RED with a thin lilac bloom; flesh meaty yet tender, juicy, sweet, slightly vinous, aromatic. The berries adhere strongly to the peduncle, and the fruit maintains its freshness long after being gathered. It is of fine quality; clusters large, handsome, closely resembling the Iona, which variety it also equals in quality and flavor. The annexed illustration shows the form of the bunch, considerably reduced in size.

JEFFERSON. Reduced ⅓.

It is one of the finest red grapes, and VERY PROMISING either for market or for home use. It ripens about the time of the Concord or soon after. Its beauty and very high character make it worthy of extensive trial. M. P. Wilder, in his address, as President of the Am. Pomol. Society, session of 1881, said, "the Jefferson of Ricketts might with propriety be denominated and may yet be distinguished as the Muscat of America." Campbell, of Ohio, wrote in his paper on the "*Improvement of our native Grapes by Crossing*," "Concord and Iona are said to be the progenitors of this grape, which has all the beauty, and I think more than the excellence, of the charming Iona. If we really have the *Iona* grape upon a Concord vine, it is an achievement whose value can hardly be over-estimated."

Jessica. A new very early *white* grape mentioned in Gardner's Monthly, Nov. 1882, coming from D. W. Beadle; apparently promising well. Not yet known.

Kalamazoo. (*Labr.*) Raised from seed of Catawba by a Mr. Dixon, an Englishman, at Steubenville, Ohio. The fruit is larger than the Catawba, and grows in bunches larger than those of that variety, and more marked in the peculiar richness of its deep blue bloom; skin thick; flesh soft, not quite tender all through; sweet, but not as rich as Catawba. According to the Amer. Pomological Society Report (1871), it is said to ripen ten days earlier, and according to the Dep't of Agriculture Report, 1872 (p. 484), it is said to ripen ten days later than the Catawba! We do not know which is correct, as we did not try this variety ourselves. The vine is said to be a vigorous grower, hardy, and very productive.

Kay's Seedling. See Herbemont.

Kilvington(?). Origin unknown. *Bunch* medium, tolerably compact; *berry* small, round, dark red with a bloom; flesh pulpy, half tender, vinous.—*Downing.*

Kingsessing. (*Labr.*) *Bunch* long, loose, shouldered; *berry* medium, round, pale red with a bloom; flesh pulpy.—*Downing.*

Kitchen. (*Rip.*) Seedling of Franklin; *bunch* and *berry* medium; *berry* round, black: flesh acid, juicy.—*Downing.*

Labe(?). *Bunch* rather small, short, oblong; *berries* medium, loosely set, black; flesh half tender, pulpy, sharp, sweet.—*Downing.*

Lama. A cross between Eumelan and some variety of the Labrusca, lately originated by D. S. MARVIN, Watertown, N. Y. *Berries* black; *clusters* small; of fine high flavor, vinous. A vigorous grower, with strong, healthy foliage; ripens about same time as Delaware. Not yet disseminated.

"LADY."

"Lady." (*Labr.*) A fine early white grape, purchased by Geo. W. Campbell from a Mr. Imlay, of Muskingum county, O.; first offered to the public in the fall of 1874, and now deservedly popular as a grape to be planted for family use and for *near* markets. It is unsuited for distant shipping or rough handling.

It is a pure Concord seedling, and has almost the vigor, health and hardiness of its parent; is like it free from mildew, but also subject to rot. The vine, in its habit of growth, foliage, and general appearance, is very similar to the Concord. It is unquestionably an improvement on the Martha grape, being larger in size, earlier, more productive, and better in quality, having less of that foxiness which renders the Martha objectionable to many. It will succeed perfectly in all localities where the Concord can be grown with good success. By reason of its early ripening it will be found specially adapted to northern localities where Concord does not always mature.* In size of *berry* it is some-

* The vines endured without injury the severe cold of the winter of 1872-73, 32° below zero.

LENOIR. (Syn., Black-Spanish, Jacques, etc.)

Lenoir. Syn., BLACK SPANISH, EL PASO, BURGUNDY, JACK or JACQUES. (*Æst.*) A southern grape of the Herbemont class, from Lenoir Co., N. C. *Bunch* medium to large, shouldered; under unfavorable circumstances, or on badly pruned, overloaded vines the bunches are loose and not shouldered; *berries* small, round, dark bluish-purple, nearly black, covered with light bloom; flesh tender, no pulp, juicy, sweet and vinous; very rich in coloring matter; a magnificent grape for the south, but too tender and too late in ripening for the north. In favorable localities it will be found desirable for wine and table. Vine a fine grower, but a tardy bearer; foliage deeply lobed.

This variety is mainly cultivated in Texas under different names, as BLACK SPANISH, EL PASO, BURGUNDY. Many years ago (about 1859), some few vines, under the name of JACQUEZ or *Jacques*, were sent to France by Berckmans, of Georgia. In 1869 and following years, when the Phylloxera commenced to devastate the vineyards of south'n France, these few Jacques vines continued in luxuriant growth and perfect health. This caused a great demand for Jacques vines, the more so as its grape, on account of its pure vinous taste and deep rich color, pleased very much the French *vignerons*. But in vain did they apply to American grape-growers and nurseries for vines of this variety. Berckmans himself stated (in 1871) that he had none, and that, so far as he knew, the culture of this variety had been entirely abandoned in this country. No one then knew that the *Lenoir* and the *Black Spanish*, cultivated in Texas, were identical with the *Jacques*.

After considerable research for this variety, WE found that G. Onderdonk, describing in his Catalogue the *Lenoir*, made the following re-

times even larger than Concord; in size of cluster, rather small. In quality it is better flavored and more delicate than Concord. In color, light greenish-yellow, covered with white bloom. Seeds few and small; skin thin; pulp tender; flavor sweet and rich, slightly vinous, and the foxy aroma of its class considerably chastened down. Although very early in ripening, it is late in starting its buds in spring, and thereby escapes the evil effects of late spring frosts.

mark: "the leaf and habit exactly resemble those of the *Black Spanish.*" From this remark, and from the description of the "*Ohio*" in *Downing's* "Fruits and Fruit-trees of America," we were strongly inclined to believe "Lenoir," "Black Spanish," "Ohio," "Jacques" identical, and the very variety which our friends in France were looking for. We so declared in the former edition of our Catalogue (1874–5, p. 70), although even Berckmans and Onderdonk then considered them distinct varieties, as may be seen from the following, written to us in August, 1876, by Onderdonk:

"I had been diligently collecting every *Æstivalis* grape of promise I could find or hear of, believing that from *this* family *must* come *our* grapes in Texas. I had a grape called LENOIR. I found that Berckmans had a different grape under the same name, and that he insisted upon *my* Lenoir being the "Black July" (or Devereux); so I sent for his Lenoir, and found that it resembled in growth and habit the *Black Spanish*—so much so, that I supposed a mistake must have been made and that he had sent me the *Black Spanish* instead of the *Lenoir.*"

"I had somehow got the idea that the Lenoir originated in Lenoir county, S.C. I wrote to Berckmans for further information and received his reply under date of Aug. 17, 1875, in which he says: 'The Lenoir and Black Spanish are both native seedlings of the *Æsticalis* type; both have colored juice. The *Lenoir* has its bunches compact and shouldered; the *Black Spanish*, on the contrary, has the bunch very loose, cylindrical, growing to a length of 18 inches. Of the two, it makes the darkest colored wine. Both are, perhaps, the best red-wine grapes we have. * * * The Lenoir originated in South Carolina, the Black Spanish in Natchez, Miss.'

"I would say," continues Mr. Onderdonk, "that here (in S.W. Texas) the bunches of the Black Spanish, though remarkably long, have never yet reached a length of more than 10 or 11 inches. I also found that, under a careful system of summer pruning, the bunches became shouldered and grew as compact as the Lenoir; and I have sometimes thought whether the difference in the fruit between these two varieties, on my premises, is, after all, any greater than even my Black Spanish differs from itself, or rather that the crops of different years differ as much from each other as they do from the Lenoir itself."

But while we announced the identity of these varieties as a *probability* only, a well-known French importer, less cautious and merely on the strength of *our* supposition, at once ordered thousands of cuttings from the Black Spanish, and offered them in France, at an exhorbitant price, as the *Jacques*, claiming its discovery for himself. Hundreds of thousands of cuttings of this variety were then sent to France and planted there since 1876, and their success, their immunity from Phylloxera, productiveness, and quality, gave great satisfaction. The identity of the *Jacques*, *Black Spanish* and *Lenoir* was there also fully established by Prof. Planchon, Pulliat, and other eminent ampelographs.

As this variety cannot be successfully grown in our vineyards on account of its non-resistance to mildew and to frost, we requested our friend Onderdonk to test and observe it, and he now writes us (August, 1883), "I am solid on this *Lenoir* matter now, and have at last become settled in the belief that Jacques, Lenoir and Black Spanish are identical *beyond doubt*: this variety is capable of very great variations under various special conditions."

In France, also, the success and especially the productiveness of the Jacques varies very much; in dry soils it yields far less wine, unless irrigation is resorted to. Of late years, the Jacques (as it is there still called) has suffered in some sections from the anthracnose. France has now more bearing-vines of this variety than can be found growing in the United States, and there is no more demand for cuttings of this variety from that country.

Jacques wine now sells in France at 60 to 70 francs per hectolitre, while their Aramon wine brings only 30 francs at the same places. It is very rich in alcohol and in color.

Of late, however, California grape-growers have directed their attention to this remarkable grape, and are now planting thousands of the same variety, under its proper name "Lenoir." It succeeds there very well, and is much liked both on account of the fine dark color of its vinous juice and for its Phylloxera-resisting roots. This old, almost abandoned grape seems destined to become one of the leading varieties of both hemispheres.

The annexed engraving represents a medium sized bunch of the Lenoir, rather smaller than usual, especially much *shorter.*

Lady Charlotte. This promising white grape was raised by Pringle, of Vermont, in 1869, from the Delaware fertilized by the Iona. It is described by the originator as follows: "Color light green, becoming amber or golden, with a reddish tinge in the sun; *bunch* large, very broadly shouldered, narrow and pointed below, compact; *berry* of medium size, globular. Flesh with some pulp, but juicy and very sweet, without the least acidity in the centre or harshness or foxiness in its flavor. Vine a rampant grower and a great

bearer, healthy; leaves very large, bearing much resemblance to those of the Iona. Time of maturity about with the Iona."

Lady Dunlap. One of Ricketts' new Seedlings, first exhibited in 1881. Berry medium, amber, vinous, quality very good. (*Report on New Fruits*, Am. Pom. Society, 1881.)

Lady Washington. (Hybr.) One of Ricketts' choicest and most promising seedlings (¼ foreign), produced by crossing Concord (*f*) with Allen's hybrid (*m*). *Vine* very vigorous, short-jointed; *leaves* large, roundish, coarsely serrated, occasionally lobed, thick and downy, luxuriant and healthy. *Bunches* very large, shouldered, often double-shouldered, moderately compact; *berries* fully medium in size, round; *skin* pale amber, yellowish with a delicate rosy tint where exposed to the sun, having a thin whitish bloom; *flesh* tender, juicy, sweet, of very good quality and delicate aroma. The berries adhere well to the peduncle, and the fruit continues a long time in use. Ripens about the same time as Concord, or soon after. A most beautiful and promising variety.

We have some vines of the Lady Washington fruiting for the first time this season. We found it a strong grower, hardy, the foliage very good; but the fruiting season was very unfavorable for *all* varieties.

Laura. (Hybr,) One of Marvin's new grapes, hardly as good as most of his other seedlings. *Bunch* small, not very compact; *berry* small, light amber, pulpy. (Am. Pomol. Society. New Fruit Rep., 1881.)

LINDLEY. (Rogers' No. 9.)

Lindley. (Rogers' No. 9.) This beautiful and valuable grape originated by hybridizing the wild Mammoth-grape of New England with the Golden Chasselas. *Bunch* medium, long, shouldered, somewhat loose; *berries* medium to large, round; color quite peculiar, and distinct from any other variety, rather more of a *brick*-red than Catawba color; flesh tender, sweet, with scarcely a trace of pulp, possessing a peculiar, rich, aromatic flavor. Pres't *Wilder* denominates this and the *Jefferson* grape the *Muscats of America*. It resembles the Grizzly Frontignan in appearance of bunch, and is regarded by some as fully equal to the Delaware in quality. The engraving represents a medium sized bunch of this variety.

Roots long and straight, with a smooth liber of medium firmness; canes slender for their length, with few laterals, and large, prominent buds; vine of very vigorous growth, making rather long-jointed wood, medium in hardness and size of pith. The foliage when young is of a reddish color; the fruit ripens very early and drops from the bunch. It makes a splendid white wine. Specific gravity of must 80°.

We recommend it as a fine table grape—one of the best of the red Hybrids.

Lincoln. Syn., HART-GRAPE. Has been supposed to be identical with DEVEREUX, but J. F. Hoke, of Lincolnton, N. C., where it has been largely grown for many years, emphatically states that it is *not* the Devereux or Black-grape (Le Noir), but was formerly known as the Hart-grape. Sam. Miller, who got cuttings of this variety from Col. Hoke, tried it and reported that it is different from Devereux, and, to his taste, superior. We could not get a proper description sufficiently clear to distinguish it from Lenoir, of which see description and figure.

Linden. (*Labr.*) One of Miner's Seedlings (see page 121), described as a black grape ripening several days before Concord, with very large bunches, which hang on the vine a month after ripening.

Logan. (*Labr.*) A wilding of Ohio. Supposed to be a great acquisition, on its introduction, and recommended by the Am. Pomological Society as promising well; but it has sadly failed to meet public expectation, and is now more generally discarded than the Isabella, to which it was deemed preferable. *Bunches* medium, shouldered, compact; *berries* large, oval, black; flesh juicy, pulpy, insipid in flavor. Vine a slender grower, early and productive.

Long. See Cunningham.

Louisiana. Introduced here by that eminent pioneer of western grape culture, Frederick Münch, of Missouri. He received it from M. Theard, of New Orleans, who asserts that it was imported from France by his father, and planted on the banks of Pontchartrain, near New Orleans, where for thirty years it has yielded abundant and delicious fruit. Münch firmly believed it to be of European origin. Fr. Hecker was just as positive that it was nothing else than the Clavner-grape of his native country, Baden, Germany. Husmann and others hold that it is a true native American, belonging to the southern division of the Æstivalis class, of which the Herbemont and Cunningham may serve as types, and of which they consider it a valuable variety, yielding a most delicious fruit, and making a very fine wine.

After many years' experience with this variety, we feel unable to form a decided opinion as to its proper classification. It may be an accidental cross between an imported and a native grape; between Æstivalis and Vinifera.

Bunch medium size, shouldered, compact, very fine; *berry* small, round, black; flesh without pulp, juicy, sweet and vinous; quality best. Vine a good grower, moderately productive; canes very stout, of moderate length, short-jointed, having few large laterals, with heart-shaped (not lobed) foliage; requires winter protection. Ripens late. *Roots* wiry and very tough, with a hard liber; wood very hard, with a small pith and firm outer bark.

The *Louisiana* and *Rulander* (or rather what we *here* call Rulander) so closely resemble each other in general appearance, growth, and foliage, that we are unable to distinguish them. If not identical, they are undoubtedly closely related to each other. It is claimed that there is a difference in the wine of these two varieties; that Louisiana makes the better of the two—in fact, the finest white wine, of Hock character, that we have.

ROBESON'S SEEDLING so closely resembles Louisiana as to consider it identical. CASPER, said to be a new Seedling, raised by Caspar Wild, of New Orleans, also resembles Louisiana, and if not identical, belongs certainly to the Rulander division of the Southern Æstivalis class.

Lydia. (*Labr.*) Originated by Carpenter, of Kelley's Island, Lake Erie; supposed to be an Isabella seedling. *Bunch* short, compact; *berries* large, oval, light green, with salmon tint where exposed to the sun; skin thick; pulp tender, sweet, of fine flavor, slightly vinous. In habit of growth the vine is not unlike the Isabella, but is much less productive. Ripens a few days later than the Delaware.

Lyman. (*Rip.*) Origin unknown. A northern variety, said to have been brought from Quebec upwards of 40 years ago; hardy and productive. *Bunch* small, rather compact; *berry* round, medium, or below; black, covered with a thick bloom; similar in flavor to Clinton, and ripens about the same time.

Sherman and *McNeil* are varieties grown from the above, but hardly to be distinguished from it.—*Downing.*

Luna. (*Labr.*) One of Marine's beautiful seedlings; probably lost by the decease of its originator. It was the largest hardy white grape we had seen before the appearance of the Pocklington and Niagara.

Maguire is like Hartford, but more foxy.—*Strong.*

Manhattan. (*Labr.*) Originated near New York. A poor bearer. *Bunches* small; *berries* medium, round, greenish-*white* with a bloom; flesh sweet, rather pulpy. —*Downing.*

Mansfield. (*Labr.* ×). Raised in 1869 by C. G. Pringle, of Vermont, a well-known and successful hybridizer, from seed of Concord fertilized by pollen of the Iona; said to combine the more valuable characters of both these popular sorts. *Vine* a rampant grower, with broad and thick leaves, densely woolly beneath; *bunch* large, often shouldered, sufficiently compact; *berry* of purplish-black color under a slight bloom; large, somewhat oval; flesh tender, with but little pulp of a remarkably rich flavor. Season earlier than Concord. It is predicted that this will prove a valuable acquisition to the northern parts of our country as a very early variety.

Marine's Seedlings. These grapes are crosses between purely native varieties claimed to be produced by a new and very simple process: diluting the pollen of the male flower with rain water and then applying it to the pistils of the variety which he selects as the female parent. Among the seedlings thus raised there are some which are quite peculiar and very interesting; some are of the *Æstivalis* family, but with berries of quite a large size: 1. *Nerluton*—fine large bunch; berries above medium, black; leaf very large and leathery, strong. 2. *Greencastle*—same as the former.

THE MARTHA GRAPE.

berries even larger. 3. *Luna*—white, in appearance almost like Martha, but the gain in size seems to be coupled with a loss in quality, compared to our delicious, juicy, small Æstivalis grapes. A larger number of his seedlings are of the Labrusca type, and among these his "*U. B.*," black; *Mianna* and *King William*, white, seemed to us well worthy of trial.

In fall of 1874, a year or two before his death, Marine wrote: "Now that I have reached my three score years and ten, I am admonished to yield the further prosecution of this branch of progress to others, more skilled, and to those coming after our time, believing as I do that much greater results are looked for in the future." His seedlings were not disseminated.

Martha. (*Labr.*) A white seedling of the Concord, raised by our friend Samuel Miller, formerly of Lebanon, Pa., now of Bluffton, Mo. *One of the most popular among the* WHITE *varieties.*

Bunch medium, smaller than the Concord, moderately compact, shouldered; *berry* medium, round, greenish-white—when fully ripe pale yellow covered with white bloom; skin thin; flesh very tender, and of a remarkable sweetness unmixed with acidity and without vinous flavor; somewhat pulpy, often containing but a single seed. Odor decidedly foxy, but this character is much more apparent in the fruit than in its wine.

The vine is very healthy and hardy, resembling the Concord, but not quite as vigorous a grower, and the leaf is of a somewhat lighter green, yet quite as healthy and the fruit less liable to rot than the Concord. *Roots* of average texture and liber, throwing out young spongioles readily. Canes generally more up-

right than Concord, with fewer laterals, but not so much inclined to ramble. Wood firm, with a medium pith. Very productive, and the berries hang well to the bunch. Ripens earlier than the Concord and will therefore suit even northern localities. In New York, New Jersey, Pennsylvania and Connecticut it is grown largely for market, succeeds well, is profitable, though not very good in quality, and is far surpassed in appearance by some new varieties. Must 85° to 90°, at least 10° higher than Concord. The wine is of a light straw color, of delicate flavor.

The French commission at the Exposition of Amer. wines at Montpellier, 1874, pronounced the *Martha* as "approaching the wines of Piquepoul, produced in the Hérault."

Seedlings have of late been raised from the Martha, but are not disseminated.

(See also "*Lady.*")

Marion. (*Rip.*) A variety brought to us from Pennsylvania by that indefatigable horticulturist, Sam'l Miller, who got it from Dr. C. W. Grant. It probably came from "Longworth's famous school of vines"; valuable for a dark red wine. *Bunch* medium, compact; *berry* medium, but considerably larger than Clinton, round, black, juicy, sweet when fully ripe; ripens *late*, long after coloring, but hangs firmly to the bunch. Blooms early, with Clinton, which variety it resembles, yet, in our opinion, far surpasses — so much so, that it almost appears a transition from the Riparia to the Æstivalis species. Vine a very vigorous grower, rambling but not so straggling as the Clinton. Wood firm with a medium pith. Foliage large, strong and abundant; when young, of a peculiar golden hue, and the branches of a beautiful red color. *Roots* wiry and firm, with a smooth, hard liber, enjoying in the fullest degree the immunity from Phylloxera belonging to its species.

Our recommendation of this variety for the French wine-grower had been long overlooked. The Vigne Américaine of March, 1883, contains the following: "With regard to intense coloring, without any foxy taste, nothing equals the wine made of the Marion grape; one-twentieth part is sufficient to give to water even a superior wine color; the somewhat violet shade is easily transformed into a lively red by adding some acid wine or a very small quantity of tartaric acid. This grape is a *loyal Fuchsin.*" One vine-grower of Bordeaux reports that he is about to plant 500 Marion vines this year.

Mary (?), raised by Chas. Carpenter, Kelly Island. Vine hardy, strong grower. Fruit ripens too late for the north. *Bunch* medium, moderately compact; *berries* medium, round, greenish-white with a bloom. Flesh tender, slight pulp, juicy, sweet, brisk flavor.—*Downing.*

Another *Mary*, an early grape, is described by *Fuller*.

Mary Ann. (*Labr.*) Raised by J. B. Garber, Columbia, Pa. *Bunch* medium, moderately compact, shouldered; *berry* medium, oval, black, pulpy, foxy, resembling the Isabella. Very early, ripening a day or two before the Hartford Prolific, and therefore formerly esteemed as an early market grape, though of an inferior quality. Now superseded.

Mason Seedling. (*Labr.*) A new white grape raised by B. Mason, of Mascoutah, Ills., from Concord seed. *Bunch* medium to large; *berry* nearly as large as Concord, round, greenish-white, becoming yellowish when fully ripe, with a fine white bloom; skin thin; flesh melting, with little pulp; sweet with just sufficient acid to give it a sprightly, vinous, refreshing taste; almost entirely free from foxiness. In quality this is one of the best of all the White Concord seedlings. *Vine* a moderately vigorous grower, perfectly hardy, with heavy and healthy foliage; not subject to mildew. While it has not proved free from rot, this variety has suffered less from this disease than Concord itself, proving decidedly more healthy and of better quality than MARTHA, which is generally taken as a standard of the White Concord varieties. The Mason grape ripens a few days before Concord; it hangs a long time and keeps remarkably well on the vine. The foliage of the Mason resembles that of its parent, but is of a lighter green and has a more whitish down on the under side of the mature leaves. We confidently recommend this grape for testing in all regions where the Concord succeeds.

Massasoit. (Rogers' Hybrid No. 3.) A fine early grape for table and market. We copy the following description by Mr. Wilder, our celebrated veteran of American pomology:

Bunch rather short, medium size, shouldered; *berry* medium to large, color brownish-red. Flesh tender and sweet, with a little of the native flavor when fully ripe. Season very early, same as the Hartford Prolific. Sufficiently vigorous and productive. In favorable localities (free from rot) this is a very profitable grape.

Maxatawney. (*Labr.*) A chance seedling, originated in Montgomery Co., Pa., in 1844. First brought into notice in 1858. *Bunch* medium, long, occasionally compact, not usually shouldered; *berry* above medium, oblong, pale yellow with slight amber tint on the sunny side. Flesh tender, not pulpy, sweet and delicious, with fine aroma, few seeds; quality best both for table and wine. Ripens rather late

MAXATAWNEY (*half diameter*).

for northern localities; but where it fully ripens, as here in Missouri, it is one of the finest of our native white grapes, much like the European white Chasselas. *Roots* slender, soft in texture and liber. Canes light and of moderate length, with average number of laterals. Wood soft with a large pith. Vine healthy and hardy, needs no protection in winter, but not a strong grower nor very productive, and in bad seasons subject to mildew and rot; foliage large, deeply lobed.

We recommend it only for garden culture, in good rich ground.

Medora. (*Æst.*) A seedling of the *Lenoir* probably crossed with the *Croton*, as the clusters from which the seed was taken came from a Lenoir vine interlaced with the branches of a Croton vine in Onderdonk's experimental vineyard. Dr. Thomas R. Cocke, an old esteemed amateur horticulturist and friend of Onderdonk, living about twenty miles below Victoria, Tex., towards the Gulf, carefully planted that seed, and selected this one as the most promising of those seedlings. The *foliage* is like the Lenoir, except that its young terminals show little or no pink tinge, which is almost characteristic in the Lenoir; the *berries* are white, medium, round, translucent enough to see the seed, and of delicious flavor—pronounced by good judges "the nicest and sweetest grape they had ever tasted"; the *bunches* are medium to large, about the same as the Warren; the vine not a very vigorous grower and inclined to over-production.

Onderdonk thinks this will prove the happiest acquisition to the grapes of the Gulf States since the Herbemont and Lenoir; he is now propagating it, and suggested the name MEDORA, being that of a daughter of Dr. Cocke.

Merrimack. (Rogers' No. 19.) Regarded by some as the finest grape in the collection of Rogers' hybrids. M. P. Wilder says:

It is one of the most reliable varieties in all seasons. Vine very vigorous, free from disease; *bunch* usually smaller than his other *black* sorts; *berry* large, sweet, tolerably rich. Season about the 20th September (in Massachusetts).

We prefer his No. 4, the "Wilder"; it is like it in quality, with by far larger and heavier bunches, and more profitable.

Miles. (*Labr.*) Origin Westchester Co., Pa. Vine a moderate grower, hardy and productive; *bunch* small, rather compact; *berry* small, round, black. Flesh tender, slight pulp at centre; brisk, vinous, pleasant. Ripens among the *earliest*, but does not hang long. We cannot recommend it for vineyard culture as a profitable market grape, but rather for family use as a *good early* table grape, especially for the North.

Minor's Seedling. (See Venango.)

Miner's Seedlings. (Not to be confounded with *Minor's* Seedling or *Venango.*) Produced by the late T. B. Miner, at Linden, Union Co., N. J. The following have been selected out of 1500 seedlings grown by him in central New York: *Adeline*, *Antoinette*, *Augusta*, *Belinda*, *Carlotta*, *Eugenia*, *Ida*, *Lexington*, *Linden*, *Luna*, *Rockingham*, and *Victoria*. Most of them are white grapes.

Minnesota Mammoth. Origin unknown; introduced in fall of 1879 by L. W. Stratton, Excelsior, Minn.: said to be a very prolific and hardy native grape, the berries of which are as large as pigeons' eggs, and to have a fine delicate flavor. We have been unable to obtain any definite information about it.

Mrs. McLure. One of Dr. Wylie's hybrids; a cross between Clinton and Peter Wylie. *Bunch* medium, not very compact, shouldered: *berries* medium, white, very vigorous, quality good as a table variety, and probably valuable also as a white-wine grape. Foliage resembling Clinton, growth very rampant.—*Berckmans.*

Missouri. Syn., MISSOURI SEEDLING. Mentioned by *Buchanan* and *Downing*, but now unknown even in Missouri. According to Downing: Probably a seedling from one of the Pineau or Burgundy grapes, which—about forty years ago—was considerably cultivated in the vineyards of Cincinnati. It was received there from the East under this name. It has short-jointed, grayish wood, spotted with dark brown specks: buds in clusters, double and triple; leaves deep-cut, trilobed.

Bunches loose and of moderate size; *berries* small, round; skin thin, almost black, with little bloom; flesh tender with little pulp, sweet and pleasant; not very productive nor of vigorous growth.

It certainly never came from Missouri.

Missouri Riesling. (See Grein's Seedlings, page 103.)

Monroe. A cross between the *Delaware* and the *Concord;* raised by Elwanger and Barry and described by them as follows:

"*Bunch* medium to large, shouldered, — something like Concord: *berries* large, round; skin rather thick; black covered with a white bloom; very handsome. Flesh juicy, sweet (sub-acid), vinous, sprightly; a pleasant, refreshing table grape. The vine is vigorous, with firm, short-jointed, hardy wood, which always ripens well; fine, healthy foliage, which has never shown a trace of mildew. Ripens with Hartford Prolific." "The MONROE is likely to prove one of our best table sorts, prolific and excellent."—*P. J. Berckmans.*

Moore's Early. (*Labr.*) Originated at Concord, Mass., by John B. Moore, from Concord seed. The illustration is an exact copy from a photograph of the bunch, and it could not be better described than by calling it an *Early Concord.* (See "Concord," page 68.)

Bunch smaller and rarely shouldered, but *berries* somewhat larger. It is, in similar soils and localities, as healthy and hardy as its parent; it is equal to the Concord in quality, but ripens about two weeks earlier. Being better than "Hartford," "Champion," or "Talman," and quite as early, it is recommended to supersede these undesirable varieties. It has been awarded first premiums at many horticultural exhibitions.

MOORE'S EARLY.

Mottled. Originated with Chas. Carpenter, Kelly's Island. A seedling of the Catawba. Earlier in ripening and less disposed to mildew and rot than its parent. Charles Downing says:

"A profuse bearer, ripening with Delaware. It will hang a long time after ripe, and keeps unusually well."

Bunch medium size, very compact, slightly shouldered: *berries* medium to large, round, distinctly mottled when held to the light, with different shades of red or maroon while ripening, but nearly a uniform dark Catawba color when fully ripe. Flesh sweet, juicy, vinous; of brisk, sprightly flavor, always rather pulpy and acid at the centre. Skin thick. Season late, ripening with Norton's Virginia. Hangs well to the bunch, and improves by being left long on the vine; more desirable as a wine than as a table grape. Vines healthy, hardy, moderately vigorous, and productive; foliage abundant; wood short-jointed.

It is recorded by three competent judges, George Leick being one, that its must weighed 94°, with acid 4 per mille.

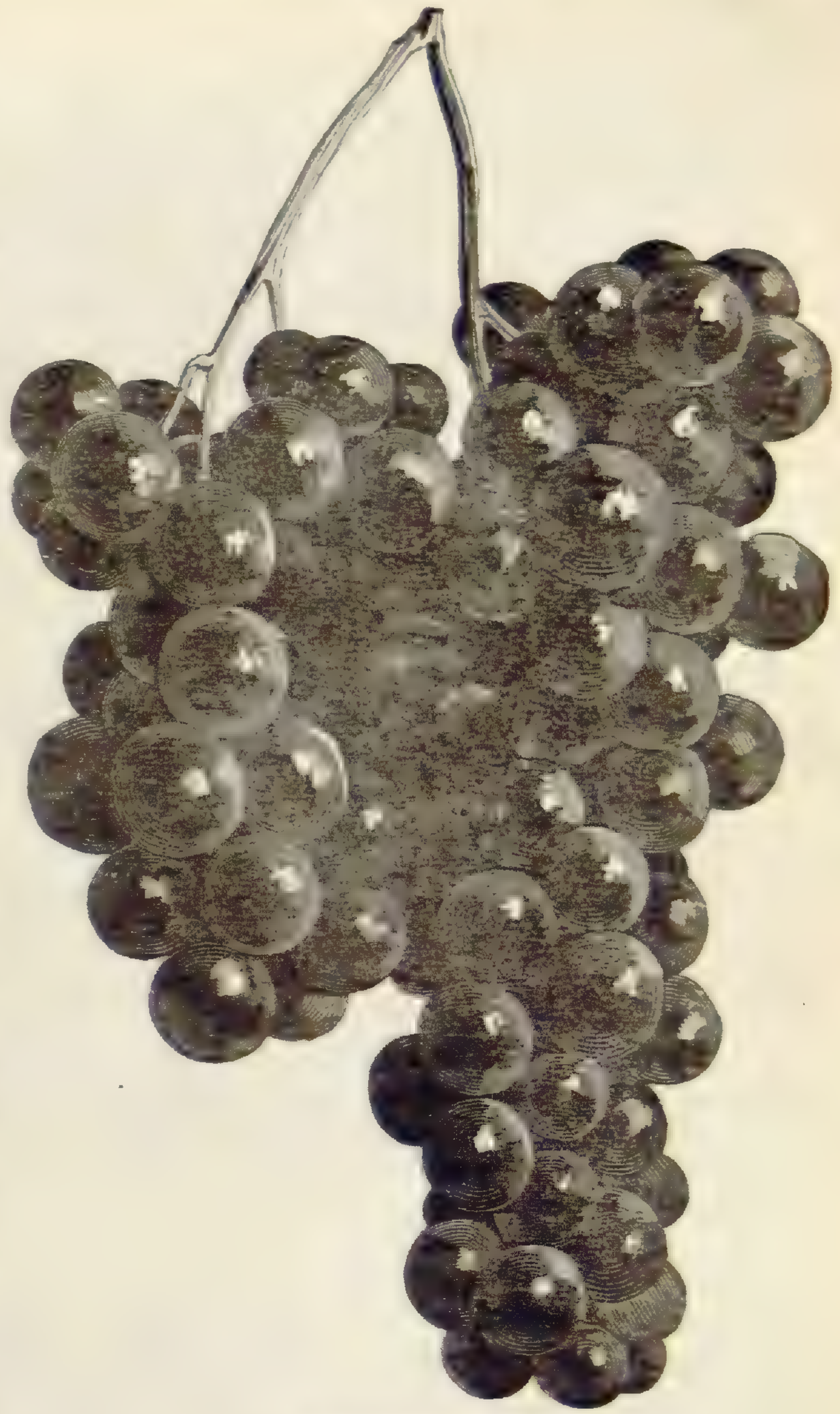
We, in Missouri, as well as Dr. E. Van Kewren, at Hammondport, found it a poor grower and bearer.

Montefiore. Rommel's Taylor-Seedling No. 14. The most promising red-wine grape of this class. *Vine* moderately vigorous in growth, but very healthy and hardy; sufficiently productive. Both wood and foliage show considerable admixture of Labrusca with Riparia. *Bunch* small to medium, compact, sometimes shouldered as in annexed engraving; *berries* of small medium size, round; skin thin but firm, black with a delicate blue bloom, and rich in coloring matter; flesh melting, vinous, sweet, with a delicate aroma and a delicious flavor; ripening (a few days) after Concord, and before Norton's Va. Seedling.

This unostentatious grape attracted the attention of our senior when Rommel first exhibited it at Rochester, New York, where the Am. Pomol. Society met, Aug. 1879, and we at once secured the wood of the original vine for the next three years. With consent of the originator, we have given it the name of the great Jewish philanthropist MONTEFIORE, which name denotes at the same time a "*Mountain-flower.*" It has fruited for several years, in various localities, with quite satisfactory results. The demand for vines of this new variety is far in advance of the supply.

At the Hermann fair, 1882, this grape was awarded an extra premium as *the best new Seedling for Red Wine.*

Must 80°.



MONTEFIORE.

Mount Lebanon. (*Labr.*) Originated by George Curtis, of the United Society of Mount Lebanon, Columbia Co., N. Y.; supposed to be a cross of Spanish Amber and Isabella. *Bunch* larger than Northern Muscadine; *berry* round, reddish. Flesh pulpy, tough, though sweet, *perhaps* a little better than Northern Muscadine. *Not tried here.*

Bunch and *berries* are of the same size as Norton's—the bunches compact, shouldered, heart-shaped. The skin of the berries is thin, black with blue-bloom, very dark, yet contains but very little coloring matter and less tannin; the pulp is meaty, very sweet and spicy, with but little acidity. Seeds rather large. The wood of the Neosho is extremely hard and tough; it cannot be propagated from cuttings. The vine is a most vigorous grower when once established on its own roots, or successfully grafted; requires plenty of room, and prefers spur-pruning on old wood. It is so hardy that it may be said to resist all the extremes of our changeable climate in Missouri. The *roots* are strong, wiry, and exempt from injury by Phylloxera. The foliage is coarse, but of beautiful color—dark and glossy green—and retains its freshness till frost sets in. The must, though fermented on the husk for two days, produces a wine of a beautiful greenish-yellow color, and has a most peculiar aroma. It ripens with Norton's Virginia.

Neosho. (*Æst.*) Found growing wild on the farm of E. Schoenborn, near Neosho, S.W. Missouri. In 1868, Herman Jaeger sent grafts of this and other varieties of wild summer grapes to that pioneer of Missouri vintners, Hon. Fred. Münch, who, finding it to be of superior quality, recommended it, and called it the "Neosho." Cultivated since that time in Warren and Newton counties, it never failed at either place to produce large and healthy crops, and gained in Papa Münch's favor every year.

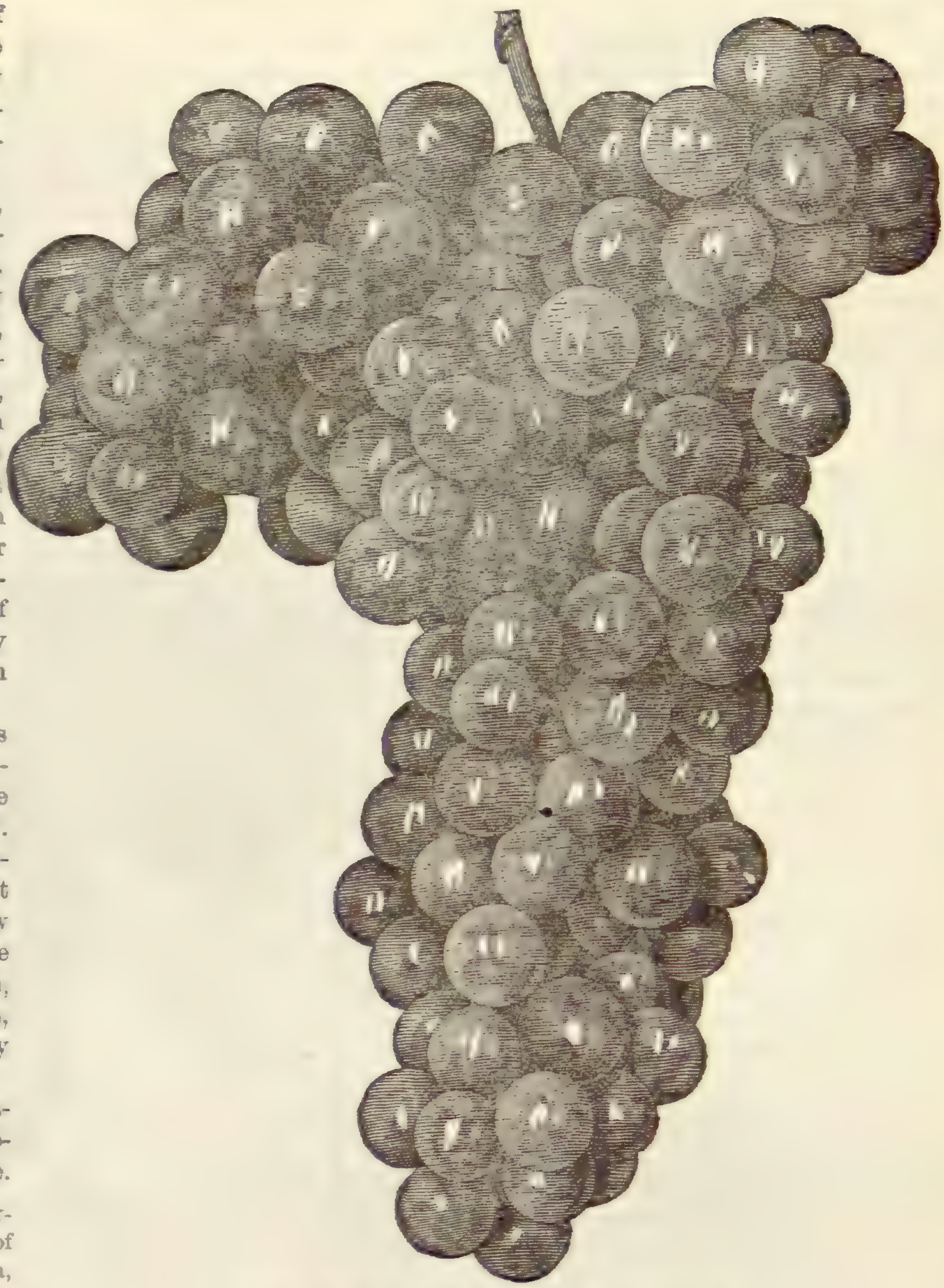
S. Miller wrote in 1873: "The fragrance of the Neosho grape is unsurpassed by any grape that ever tickled my olfactory nerves. Neosho is a treasure to the land." So also thought our enthusiastic, now lamented, friend Münch; but in other localities it produced unsatisfactorily, and the flavor and bouquet of its wine found no favor. Münch described it as follows:

Naomi, a hybrid of Clinton and one of the Muscats produced by J. H. Ricketts. Downing describes it as follows:

Vine very vigorous, very productive, long-jointed; leaves very large, deeply lobed, coarsely serrated; *bunch* large, shouldered; *berry* medium, roundish-oval, pale green, often with a tinge of red in the sun, covered with a thin whitish bloom; flesh juicy, melting, rather crisp, sweet and sprightly, and with a trace of muscat flavor; quality very good. Ripens with Concord.

Ricketts pronounces it one of the most magnificent grapes for the table that ever grew. With us it does not succeed, suffering, as most hybrids do, from mildew (*Peronospora*); where this disease is unknown, or but seldom prevails, this grape is certainly most desirable.

The annexed illustration is reduced to two-thirds its natural size.



THE NAOMI GRAPE. Reduced ⅔.

Neff. (*Labr.*) Syn., KEUKA. Origin on the farm of one Mr. Neff, near Keuka, on Crooked Lake, N. Y. *Bunch* medium; *berry* medium, dark copper-red. Flesh pulpy and somewhat foxy. Good native, early.

Newark. A hybrid of Clinton and Vinifera, raised in Newark, N. J. Vine of vigorous growth, hardy and very productive. *Bunches* long, loose, shouldered; *berries* medium, dark, almost black, sweet, juicy and vinous, of pleasant taste; but, however promising for a few years, it becomes soon diseased, its fruit subject to rot, and perishes, like its European parent. It can not be recommended.

Newport. (*Est.*) Said to be a seedling from and similar to Herbemont.

Niagara. (*Labr.* ×) This new grape, "heralded like Niagara herself as one of the wonders of the world," originated in 1868–72 with Hoag & Clark, of Lockport, N. Y., who gave the following description of it:

Vine a cross of Concord and Cassady, hardy, healthy, very vigorous and very productive; wood rather long-jointed; leaves large, thick, leathery, downy, lobed, sometimes double-lobed, much like Hartford Prolific. *Bunch* medium to large, from 8 to 14 ounces in weight, compact, occasionally shouldered; *berry* large, roundish slightly inclining to oval, quite uniform in size; skin thin but tough, pale green at first, but changing to pale yellow when fully ripe, with a thin whitish bloom; flesh soft, tender, sweet, pleasant, and in quality about the same as Concord, ripening with it or soon after; it has quite a foxy odor when first gathered, but loses much of this when fully ripe, and has then a flavor and aroma much liked by those who have tasted this grape.

The proprietors of this new grape refused, until lately, to sell any vines thereof, and still jealously guard against its being propagated by others. They expect that, from the fine appearance of its fruit at

Exhibitions and on the markets of great cities, a desire will spring up to grow the same, and thus enable them to introduce it on a large scale, at a high price, with far greater success. For this purpose, and to still further test this grape, the proprietors now propose to furnish vines for vineyard planting on *special terms*, "payment for 95 per cent. of the cost of such vines made contingent on one-half the net sales of fruit therefrom, and *all* the *wood* to be returned to them up to and including 1888." While these terms are, in *one* point of view, very liberal, we doubt that they will have the desired result. We believe that the *Worthington*, which equals the *Niagara* in quality, size and beauty, and is now liberally disseminated without restrictions, promises to become a more popular grape and to make the introduction of the Niagara hereafter less called for.

Noah. (*Rip.* ×) Raised from TAYLOR seed by *Otto Wasserzieher*, Nauvoo, Ills., in 1869; then twice transplanted, sent to us for testing, **and fruited first in 1873.**

Bunch medium, shouldered, compact (yet not too closely compact, well-filled, but not overcrowded); *berry* medium to above medium in size, being but slightly smaller than Concord; of green color, turning yellowish when fully ripe; skin thin but firm, transparent; not very juicy, pulp firm yet melting, and of excellent quality. Its *must*-weight is 10° above that of Concord grown and pressed in same locality; time of ripening about ten days after the Concord. *Foliage* large and firm, glossy,

with a very slight down underneath and adhering well to the vine until frost.

From this description it will be seen that it resembles Elvira in many respects, which is quite natural, being of same parentage (but is *not* a seedling of Elvira, as incorrectly stated in several Nursery Catalogues). It is *quite distinct* even in appearance, and there is no difficulty in distinguishing the two in foliage and fruit. The originator of the Noah claims for his seedling greater firmness of the bud or eye, which enables it the better to resist severe cold in winter; a firmer skin, which will *not crack* as that of the Elvira. These characteristics may be inherent, or may be modified by growing in a more southern latitude. Both grapes are excellent for white-wine.

The Noah was first disseminated by us in 1876, and has now already gained great popularity and a place on the Catalogue of the Am. Pomol. Society. At a test of the must, made by impartial experts, the Noah stood 100° on Oechsle's scale with 7.50 per mille acid, whilst at the same time the Elvira weighed 88° with 5 per mille acid.

Reports from most parts of this country, in regard to growth, health, &c., are very favorable, while in some localities the fruit mildews in unfavorable seasons; it is, so far, less liable to rot than other varieties.

In the fall of 1881, *E. A. Riehl*, of Alton, Ill., after a long tramp among the vineyards of Illinois and Missouri, wrote: "Of the NOAH, I predict that it will grow well, bear well, keep well on the vines, ship well, sell well, and make lots of money for its growers. In fact, it will be a white grape for the million."

J. Balsiger, of Highland, Ills., gladdens us with the following lines: "I am very thankful to you for having sent me this valuable variety. Too much cannot be said of its good qualities, according to my observations."

In France, also, the Noah has become a favorite, and is largely planted. LOUIS REICH, the eminent viticulturist at Armeillier, *Bouche du Rhone*, who has cultivated the "Noah" since 1878, finds it more vigorous and productive than Elvira, but thinks that the strawberry-taste of its grapes is not very pleasant, and that it makes no good wine; others find that most of the foxiness disappears soon and the wine improves, and that its strawberry-taste is quite acceptable.

The accompanying illustration is copied from a photograph taken during the very unfavorable fruiting season of 1882, and represents two bunches, *below* average size, of this valuable variety. The size is reduced; the single berry shows the full natural size.

Norfolk. (*Labr.*) A new grape, originated by *White*, of Norwood, Mass. It so nearly resembles the *Catawba* that it would be taken for nothing else, if it did not ripen even *before the Concord.* At least, the originator showed to a committee of the Mass. Horticultural Society that the Norfolk was fully ripe on his place while his Catawbas had barely begun to color. The vine is said to be an abundant bearer of remarkably showy fruit, heavily covered with lilac bloom, and to have withstood a temperature of 18 degrees below zero without protection and without injury.

North America. (*Labr.*) *Bunch* medium, shouldered; *berry* round, black, juicy but foxy. Ripens about with Hartford Prolific. Vine vigorous, unproductive.

Northern Muscadine. (*Labr.*) A seedling raised by the Shakers of New Lebanon, N. Y. Opinions differ widely about its value. Papa Münch (as we called our venerable friend, the Hon. Fred'k Münch), placed it as a table grape next to the Diana, and as a wine grape far above the Venango. *Bunch* medium, very compact, almost round; *berry* medium to large, dark amber-colored or brownish-red, flesh pulpy and foxy, sweet, skin thick. Berries apt to drop from the bunch when ripe. Ripens early, about two weeks before Catawba. Vine of luxuriant growth, hardy and productive. Its must will probably be found valuable to mix, in small proportion, with some other variety, to which it would impart, we believe, a fine Muscat flavor.

North Carolina. (*Labr.*) This seedling originated with that veteran pomologist, J. B. Garber, of Columbia, Pa.; it belongs to the Isabella type, and is a showy market grape of poor quality; not recommended. *Bunch* medium to large, occasionally shouldered, moderately compact; *berries* large, with a slight blue bloom; flesh pulpy but sweet; skin very thick; hangs well to the bunch, and will keep well and carry to market in good condition. Ripens early, coloring a few days before the Concord. Vine a rambling grower, hardy and very productive; requires long pruning and "plenty to do." *Roots* abundant, thick, firm, with a tolerably hard liber; is a good resistant to Phylloxera, but much subject to rot. Canes of medium thickness, long and rambling, with an average complement of laterals. Wood firm with a medium pith. The initiated can also make a good Muscatel wine of it. Must 84°:

Norton or **Norton's Virginia.** A native wild grape found on Cedar Island, James river, about four miles above Richmond; discovered there in 1835 by Dr. F. A. Lemosq and recommended as a wine grape by Dr. D. N. Norton, an amateur horticulturist, and one of the pioneers in horticulture near Richmond, Va., who transplanted layers from the original vine to his garden and introduced it to public notice. It made but little progress until about thirty years ago, when Mr. Heinrichs and Dr. Kehr brought it (each a few sprigs) to our Hermann vine-dressers.

This little insignificant-looking grape, pronounced worthless by Longworth, the father of American grape culture, has, nevertheless,

become *the* great and leading variety for red wine not merely in Missouri, where its superior qualities were first appreciated and brought out in full splendor, and in its native State, Virginia, where it is of late receiving great attention, hundreds of acres being planted in the years 1880-83, with this most valuable variety for wine,—but, far and near, in many sections of this country, and even in some parts of France where American vines are planted.

The Norton, with its twin-sister, the Cynthiana, is now recognized by all experienced grape-growers as *the most reliable* and *best red wine grape* of America. It is also found excellent in some parts of France; in others it does not succeed as well, and its yield is considered insufficient. Except in size of berry, it has also most qualities of a very good table grape; it is sweet and spicy, and is unexcelled as a long keeper.

The illustration of the Cynthiana, page 89, equally serves as a good representation of the Norton-grape.

The *bunch* of the Norton is long, compact, and shouldered; *berry* small, black, with dark bluish-red juice, almost without pulp when fully ripe; sweet and brisk. Ripens late, in October. Vine vigorous, healthy, hardy, and productive when well-established, but very impatient of transplanting, and exceedingly difficult to propagate. *Roots* tough and wiry. Liber thin and hard, of great resistance to the Phylloxera. Canes vigorous, of medium thickness and good length. Wood *very* hard, with a small pith and firm outer bark.

Wherever the season will admit of a thorough and perfect ripening of its fruit, the Norton will succeed here in almost any soil; but, when the wood and buds have not fully ripened in the fall, the vine is liable to suffer from severe cold during the succeeding winter. In rich bottoms it comes early into bearing and is enormously productive; on high hills with rather poor soil and southern aspects it is tardy in coming into bearing, but produces there the richest wine, of great body and superior medical qualities.* It has quite a peculiar coffeine flavor, which at first seems unpleasant to many, but which, like coffee, endears itself to our taste. Must 105°–110°.

From Norton's seed two promising *white* grapes have been raised almost simultaneously: one by Langendorfer, sen., at Hermann, Mo.; the other by J. Balsiger, of Highland, Ill. These and the white *Hermann* seedling (see *Hermann*) are the first *white* Æstivalis we know of; Balsiger's seems a cross with Labrusca. They are *very late*, ripening even later than Norton's, and thus will not be adapted to locations north of St. Louis, but may be the more valuable for the south.

* It is the great remedy here for dysentery and diseases of the bowels.

Norwood. (*Labr.*) A new grape, owned by Rev. J. W. Talbot, of Norwood, Mass., but originated, we believe, by Mr. White, of same place; first exhibited in the fall of 1880, before the Mass. Horticul. Society: it received a first-class certificate of merit for some very fine bunches. It is said to make a larger cluster and larger berry and to ripen a little earlier than Concord; is claimed to be a strong grower, more hardy than any of Rogers' hybrids, and in quality from good to best, much superior to the Concord. Not yet tested by us.

Ohio. Syn., Segar-Box, Longworth's Ohio, (Black Spanish Alabama?), is now supposed to be identical with the "Jacques" or "Jack" introduced and cultivated near Natchez, Miss., by an old Spaniard of the name of Jacques. It used to be grown in Ohio, where the stock originated from a few cuttings left in a segar-box, by some unknown person, at the residence of Longworth, of Cincinnati, Ohio. This variety attracted a good deal of attention for some time on account of its large, long *bunches* (often ten to fifteen inches long, rather loose, tapering, shouldered), and its good quality; its *berries* are small, round; skin thin; purple with a blue bloom; flesh tender, melting, without pulp, brisk and vinous. The wood is strong, long-jointed, lighter red than that of the Norton's Virginia, and smooth, with peculiarly pointed buds. Leaves large, tri-lobed. At first it was also a good bearer, but soon mildew and rot affected it so badly that it was of no use, even when grown upon walls with protection. Downing ("Fruit & Fruit-trees of Am.") said, "it is most likely a foreign sort, and, except in a few locations, a *sandy soil*, and a mild climate, it is not likely to succeed." Geo. W. Campbell, whom we have to thank for valuable information on this and many other varieties, says, "I always considered the Ohio or Segar-Box, from its fruit, habit of growth, and foliage, as of the same family as Herbemont, *Lenoir*, Elsinburgh, and that class of small, black, southern grapes." Samuel Miller, of Bluffton, Mo., writes us: "The Segar-box, or Longworth's Ohio, I had in the East for years, but never grew a perfect bunch. It was not hardy in vine, and the fruit both mildewed and rotted."

When ripe it is an excellent grape. A few vines sent years ago, under the names of "*Jacques* or *Ohio*," to France, by P. J. Berckmans, of Georgia, proved very fine and valuable, perfectly resisting Phylloxera, having remained healthy in the midst of vineyards destroyed by the root-louse. (See Lenoir.)

In Aug., 1876, G. Onderdonk gave us the subjoined information concerning the supposed identity of the Black Spanish, Ohio, and Jacquez:

"There lived at Natchez, in Mississippi, an old Spaniard by the name of Jacquez. He originated a grape to which he gave *no name*. Some persons got hold of it and called it the Jacquez grape, not as a name but simply to designate it as old Jacquez's nameless grape; others called it the *Spanish* or *Black Spanish* grape, as it came from the old Spaniard's garden. Then

a traveler, whose name was never obtained, carried some cuttings of this grape to Cincinnati, where he left them with a nurseryman (Mr. Longworth!) there, packed in a cigar-box; thus it came that they were designated as the 'Cigar-box grape,' *not as a name*, but to designate it till its true name would be known. This nameless variety circulated about Ohio, and, carried from that State without yet a name, took the name of *Ohio* with those thus obtaining it. Finally, as no authoritative name appeared, each called it the Black Spanish, Jacquez, Cigar-box, or Ohio, according to the several temporary designations.

"I at first got it from a neighbor, who obtained it from Berckmans, in Georgia, as the Cigar-box. I afterwards heard of the Black Spanish as a wonderful grape, and procured it from Gonzales, Texas, and several other Texan sources. I soon found it identical with the Cigar-box. I got afterwards information from different sources that these four names represented the same grape. I cannot now remember from whom I got the history of the old Spaniard Jacquez and of the various names having originated as I have stated; but I am altogether satisfied (from examining the matter for several years) of the identity of Black Spanish, Jacquez, Cigar-box, and Ohio.

"If there is any valuable difference between the *Black Spanish* and *Lenoir*, it is in favor of the latter."

In August, 1882, however, Onderdonk wrote us that, having obtained from Campbell a plant of the "*Ohio*" or "*Cigar-box*," he can testify that *his* "OHIO" is distinct from the variety cultivated in Texas under the names of Black Spanish, El Paso, Jacquez, &c.

Oneida. Said to be a hybr. seedling of MERRIMACK (Rogers' No. 19), raised by Thacker, of Oneida Co., N. Y., who states that the vine bore its first fruit in the fall of 1875, when four years old, and is a strong, healthy grower, free from disease of any kind thus far; *wood* short-jointed, and ripens well; a good bearer: *bunches* medium size, evenly shouldered, sufficiently compact: *berries* large, twice the size of Delaware, which it resembles in color; skin brittle, with a delicate bloom. It ripens on the original vine gradually from the 10th to the 25th September. Keeps well and does not drop from the stem. A. M. Purdy, Palmyra, N. Y., who introduces this new sort on subscription, to be delivered in the spring of 1884, thinks that the Oneida will prove *the best and longest winter-keeping grape* yet introduced.

Onondaga. A seedling originated in Fayetteville, Onondaga Co., N. Y.; a cross between the Diana and the Delaware; said to combine in some degree the flavor of both, ripening at the same time as Delaware, and to be a late keeper. Its appearance is certainly very fine, resembling Diana. Should it prove as good and healthy as its originator claims, it would indeed be a valuable acquisition as a market grape. Not disseminated.

Oporto. (*Rip.*) Of the same character as Clinton: a true native with a foreign name. *Bunches* small, usually very imperfect: *berries* small, black, harsh, and very acid. Considered a very poor variety by Fuller. "Of no value, a complete humbug."—*Husmann.*

Regarded as a valuable wine grape by Gov. *R. W. Furnas* of Nebraska, who says (Report to Am. Pomol. Society, 1871, "My vines of Oporto have never failed to give a fine crop; last year I picked *eleven hundred* good bunches from *one* vine five years old. It is an exceedingly rampant grower, and, as a rule, the bunch not compact, bearing the fruit on until after first frosts in fall. I have found the Oporto to give a first-class yield of very good wine—greatly improved by age."

The difference of opinion is attributable, no doubt, to differences in soil, &c.; in a granitic, shistose (slaty) soil the Oporto flourishes best, while in alluvial soil it loses its foliage. In some parts of France it is used as a Phylloxera-resisting grafting stock.

Othello. (Arnold's Hybrid No. 1.) A cross from Clinton, or what is called Clinton in Canada, fertilized by the pollen of Black Hamburg. Described as follows: "*Bunch* and *berry* very large, much resembling the Black Hamburg in appearance. Black with a fine bloom. Skin thin, the flesh very solid but not pulpy; flavor pure and sprightly, but in the specimens we have seen rather acid. Ripening with the Delaware."

The "Ampelographie Américaine," of which we have just received the first number, describes the OTHELLO as follows: (Translation.)

Vine vigorous, of half-erect growth. *Cane* of medium length, somewhat slender, round, shining, and but little wrinkled; of yellowish-brown color when the wood is ripe, darker on the nodes and portions exposed to the sun; with elongated internodes, heavily striated; intermittent 2-forked tendrils. *Buds* covered with russet hair, not numerous and falling early. In opening the buds become whitish and show the flower-bunches fringed by a fine wooly down with a carmine border on the surrounding foliage, which opens and expands rapidly; these leaves are distinctly three-lobed, sometimes five-lobed, whitish on their lower face with isolated rosy points on their outline, deeply dentate and glandular. *Foliage* large when full grown, three-lobed with a narrow bay at the leaf-stalk (sinus pétiolaire), the borders of the lobes overlapping; with two series of very sharp teeth: upper face dark green, lower face of a whitish-green with a wooly down arranged in small tufts on the lower veins. Leaf-stalk very short, robust, and forming an obtuse angle with the plane of its limb or cane.

Then follows a description of the *flowers* or blossoms in terms which we are scarcely able to translate; then of the *bunch* with its peduncles and pedicels; of the *berries*, their size, shape, color, skin, pulp, juice, taste, aroma, &c., with a minuteness and exactness which may interest the scientific specialist, but for which we have not the space, nor, as practical grape-growers, the time to study them. To us it would be more important to know the conditions of soil and climate which the variety demands, whether it inclines to or resists diseases, where and how it succeeds, &c.

Our experience with it has not been as favorable as we expected. The vines proved good growers, with beautiful, large, deeply-lobed smooth foliage, but not very productive, and what fruit it produced was often destroyed by rot. Here the bunches by no means resemble the Black Hamburg in appearance, nor are

they with us as good in quality as Arnold's other hybrids.

In France, however, the Othello does exceedingly well, is enormously productive, and pleases so well in quality and appearance that it is largely propagated and in demand; at Nimes, with M. Guiraud, it has resisted for the last eight years in the midst of a Phylloxera-infested district, and wherever tried it has so far proved sufficiently resistent to the insect.

At a meeting of the Agricultural Society of the Herault, held on the 5th, 6th and 7th of March, 1883, at Montpellier, M. SABATIER stated, that eight years previously he had received from Bush & Meissner one dozen OTHELLO plants (for $5); his neighbors had taken some, which also had succeeded admirably, and of those which he kept for himself he was offered last year 1500 francs per 1,000 cuttings; such offers he could not well refuse, and the purchasers thanked him besides!

M. PIOLA also stated that his Othellos were prospering: 300 vines, the third summer, gave him 200 litres wine. Some consider the Othello wine the most remarkable of American wines; that it is destined to take the place of the *Malbec* in the Bordelais; others say that the wine made of Othello, though at first too acid, becomes very refreshing and agreeable, equal to the best ordinary wines of the lowlands of France.

M. GAILLARD states: the Othello succeeds well notwithstanding a little mildew; the great wine merchants compare its wine to the mountain wines. As soon as the young plants could be obtained at 50 fr. the mille, our vintners would not plant anything but Othello. M. FOEX and IM THURN think this variety not yet sufficiently tested; it commences to fail at the experimental gardens of the former and are weakening at GUIRAUD'S. The very high price paid for them is not justifiable, and caution is advisable.

Owasso. (*Labr.*) A chance seedling, supposed to be from the Catawba. Goodhue, the originator of this grape, claims that it combines the following desirable qualities, viz.: hardiness, size, beauty, quality, productiveness, and adaptation to the climate of the northern States. Fruit clusters large and compact; quality excellent: has a sprightly taste. A good keeper. Color dark amber. Ripens with the Delaware.—*Monroe Co. Nurseries.*

Pauline. (*Æst.*) Syn., BURGUNDY OF GEORGIA, RED LENOIR. A southern grape, of the Lenoir family. Said to be superior for both wine and the table. Of little value here and at the north, where it does not ripen or grow well. *Bunch* large, long, tapering, shouldered; *berries* below medium, compact, pale amber or violet with a lilac bloom; flesh brisk, vinous, sweet and aromatic. "The most delicious grape we have seen."—*Onderdonk.*

Growth moderate and peculiar; comes late into bearing; sometimes sheds a part of its leaves too early. Onderdonk believes it to be a hybrid and *not* a pure Æstivalis. (See also Bottsi.)

Pearl. (Rommel's Taylor Seedling No. 10.) A promising new variety both as a table and a wine grape. *Bunch* larger than his Elvira, shouldered, compact; *berry* medium, round, pale *yellow* covered with a delicate bloom; skin thin and transparent; pulp soft and melting, juicy, sweet and high-flavored. Vine a very strong grower, of short-jointed, grayish wood, with bright green leaves; very productive, healthy and hardy. Ripens immediately after Hartford.

Peabody, a seedling of *Clinton*, fruited by Jas. H. Ricketts for about 12 years, but not offered for distribution until lately. He says, "it is hardy in vine and fruit; bunch medium to large and quite compact; berry the size and shape of Iona, black with blue bloom: flesh tender, juicy, rich, and sprightly. The fruit is unlike that of any other grape now cultivated; first-class in every respect."

Peter Wylie. See Dr. Wylie's New Grapes.

Pizarro. (*Hybr.*) One of Ricketts' Clinton seedlings crossed with foreign (Vinifera); foliage resembling the Clinton; productive. *Bunch* long, rather loose; *berry* medium, oblong, black, very juicy and spicy, with a very fine aroma.

J. H. Ricketts says: "I have fruited the Pizarro many years and thoroughly tested it for wine-making purposes. It makes a light red summer wine of great richness."

Planet. (*Hybr.*) Mentioned by Prof. Husmann as one of the foremost of Ricketts' seedlings, otherwise entirely unknown to us. Described in his "Amer. Grape-growing" as follows: Concord and Black Muscat of Alexandria — healthy and productive: *bunch* large, loose, shouldered; *berry* large intermixed with smaller ones which have no seed, oblong, very tender pulp, juicy, sweet, fine flavor with slight taste of the Muscat.

Poughkeepsie-Red. This grape originated by A. J. Caywood & Son, from Iona crossed with mixed pollen of Delaware & Walter. It is an admirable grape both for its beauty and fine quality; and those who have seen it growing at Caywoods' place at Marlboro', N. Y., testify to its vigorous growth. *Cluster* above medium, compact and well-shouldered; resembles Delaware more than any other variety, but is about one-third larger, rather darker red with less bloom; quality best; no pulp, melting like Iona. Claimed to be very valuable as a wine grape. It ripens very early, with Hartford Prolific, and keeps a long time after being removed from the vine, tasting like raisins when shrivelled. As a dessert fruit, it is considered by good judges as equal to fine European grapes.

Although known on the Hudson for over twenty years, and exhibited at New York State fairs, it has been but little tested and not disseminated outside.

Its parentage does not give confidence of success except where the Delaware and Iona can be successfully grown, and that is—in localities few and far between.

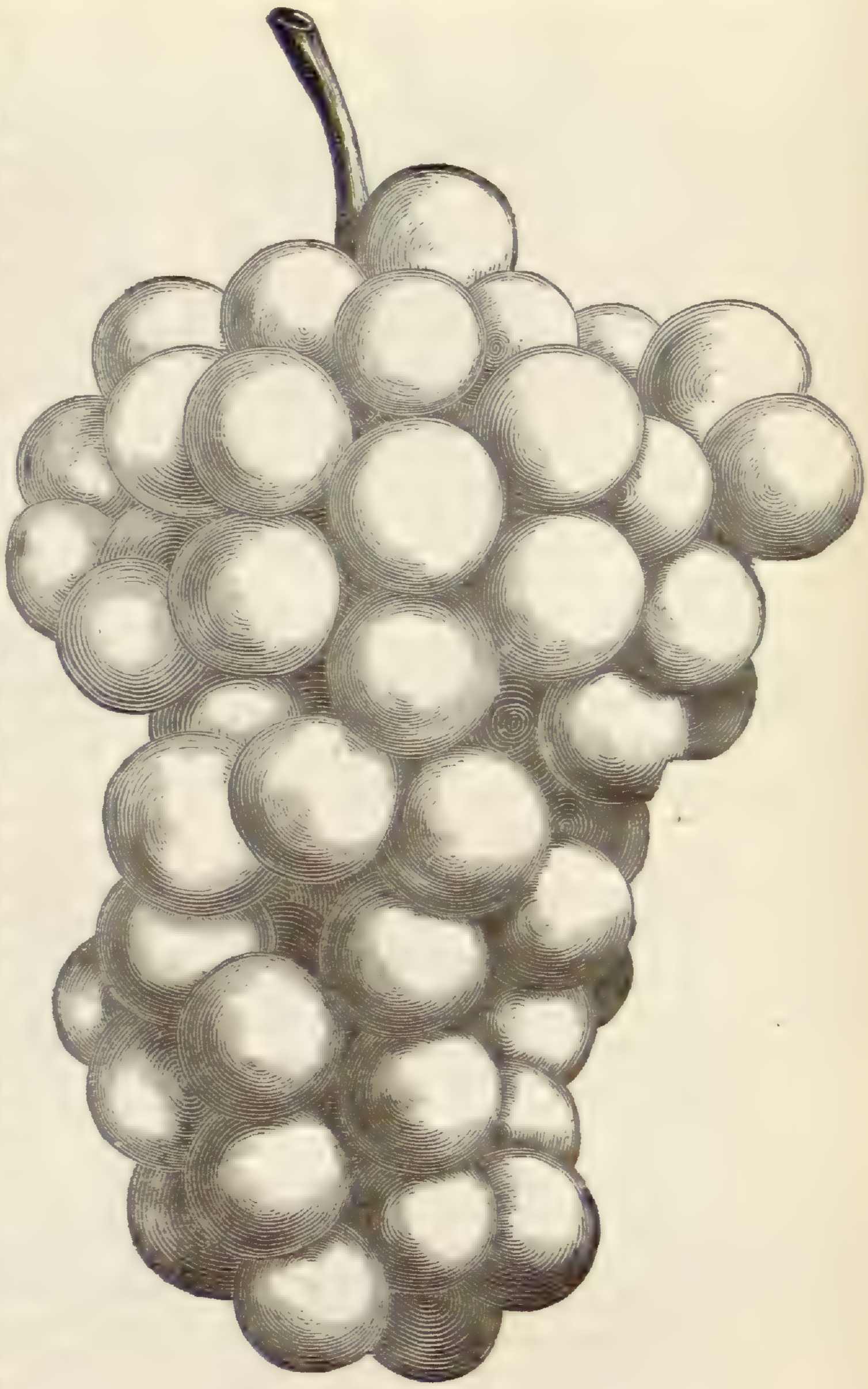
Putnam, or Ricketts' Delaware Seedling No. 2. Cross between Delaware and Concord: very early, sweet, rich and good. Must stood 80° saccharometer: 4½ per mille acid. Not disseminated, we believe.

Perkins. (*Labr.*) Origin, Massachusetts. A valuable, very early market grape, as it is showy, which is more important for our markets than fine quality; besides, tastes differ, and to many tastes its strong fox or musk flavor is not disagreeable. *Bunch* medium to large, shouldered; *berries* medium, oblong, often flattened by their compactness; greenish-white at first, then of a fine, pale lilac or reddish color when fully ripe, with a thin, white bloom; flesh rather pulpy, sweet, juicy; skin thick; ripens a few days after Hartford Prolific and before Delaware; vine a vigorous grower, with thick leathery leaves, healthy and productive.

It is one of the surest grapes we cultivate, succeeding remarkably well south as well as north, and is more *free from rot* than most other Labrusca varieties. It is also not without value as a wine grape; its foxy taste and odor grow less the older the wine becomes, and can be improved by gallizing, or, better still, by blending with other white wines.

Pollock. (*Labr.*) Raised by Mr. Pollock, Tremont, N. Y. *Bunches* large as Concord, compact; *berries* large, dark purple or black; flesh free of pulp, vinous, not too sweet.—*Strong.*

Purple Bloom, a seedling of *Hartford Prolific* crossed with *Gen. Marmora*, raised by Dr. Culbert, Newburgh, N.Y. *Vine* hardy and vigorous, a prolific bearer; its *bunches* are large and showy; *berries* of fair size and good quality. Well adapted to become a good market grape. Exhibited 1877. Not disseminated.



PERKINS.

Pocklington. (*Labr.*) A seedling from Concord, originated by Jno. Pocklington, at Sandy Hill, Washington Co., N. Y.; the largest and most attractive white grape of *purely native* origin yet introduced. *Vine* a strong grower and very hardy, with large, leathery, pubescent foliage similar to Concord; free from mildew. *Clusters* large and showy, weighing sometimes as much as one pound each. *Berries* large, pale green with yellow tinge, round and thickly set on the bunch; flesh tender, juicy and sweet, with very little pulp. Seeds small for so large a grape. Ripens with the Concord, and when fully ripe is better than Concord. It has less of the Labrusca character (foxiness) in the taste than in the smell, and seems to have better keeping and shipping qualities than the parent. Being considerably larger in bunch and berry than Martha, more attractive to the eye and better in quality (though not best), and very productive, this is *one of the most promising new varieties for vineyard culture;* a splendid grape FOR MARKET.

Samuel Miller says: "It will also make good wine without doubt; it will, however, be some years before much wine will be made out of Pocklington, for it will be in too great demand for the table." He adds: "While the *Martha* has done nobly—thousands of acres are planted with it, and I need not be ashamed of having originated it—I now resign and give the palm to Mr. Pocklington."

Branch 20 inches. Weighing 7 pounds. Exhibited at meeting of Am. Pom. Society, Rochester, N. Y.

THE PRENTISS.

From a Photograph by G. W. Godfrey, Rochester, N. Y

P. J. Berckmans, on the other hand, considers it worthless in his locality. He writes us: "It may do well north, but is so far of no value here" (in Augusta, Ga.)

It was first exhibited at the New York State fair held in Rochester in 1877, and has been justly awarded FIRST premiums at various exhibitions *every* year since. From what we have seen and heard of this new grape, we are satisfied that it will rapidly become a favorite among grape-growers, for market and family use, wherever the Concord is successfully grown.

"The Pocklington, in size and beauty, is an approach to the Canon Hall or other Muscats.—*Marshall P. Wilder.*

(See the chromo-lithograph illustration opposite the title page.)

Prentiss. (*Labr.*) One of the best native white grapes, where it succeeds; raised about 16 years ago, by J. W. Prentiss, Pultney, N. Y., from seed of Isabella. *Vine* hardy, enduring uninjured down to 20° below zero, and a good grower, very productive, inclined to overbear; wood rather short-jointed. *Leaves* large, yet tender here; slightly downy; as healthy as those of Catawba, Isabella, or Diana, resembling the latter. *Bunch* medium, not often shouldered, compact. *Berry* medium round, inclined to oval; skin not very thin, but very firm; greenish-white, pale yellow when fully mature, sometimes with a slight rosy tint on side most exposed to the sun, with a thin whitish bloom; seeds few, small, dark; flesh with a slight pulp, tender, juicy, sweet and pleasant; a musky aroma, free from coarse foxiness; fruit *very similar to Rebecca*, and Hubbard himself "thought it had traces of Rebecca blood in it." The berries adhere well to the peduncle and keep well. Ripens at same time as Concord. A valuable and profitable market grape where it succeeds. Selling in large quantities at 15 cents per pound in New York markets when Concords were selling at 4 to 6 cts.

T. S. Hubbard, Fredonia, N. Y., who introduced this grape, says: "We do not expect it will succeed everywhere, nor do we claim it to be a grape that will succeed over as wide a range of territory as the Concord, but we recommend it as a VERY PROFITABLE *market grape* for good grape localities."

How it will succeed in vineyards of the lower Missouri and Mississippi valleys we cannot tell, as it has not been sufficiently tested, and its parentage does not encourage extensive trials in this section. Testimonials as to the growth and health of this variety are, so far, favorable.

The annexed beautiful chromo-lithograph of the Prentiss was furnished us for this Illustrated Catalogue by Mr. Hubbard.

Purity—a cross upon Delaware, produced by Geo. W. Campbell, is a small white grape of the finest quality. It is claimed to be a stronger grower and to have healthier foliage than the Delaware. It ripens its fruit a few days earlier than that variety. Campbell gave it that name on account of the purity of its

flavor, which he pronounces as even more exquisite than that of the Delaware. He says: so far as quality is concerned it is probably unexcelled by any variety grown, its only fault being its small size. The vine seems to have inherited from its parent, the Delaware, its remarkable exemption from rot. We recommend this new variety for trial to all who plant for their own use and pleasure, and are willing to compromise size for fine quality.

Quassaick. A hybrid of Clinton and Muscat-Hamburg, by J. H. Ricketts, of Newburgh, N. Y. It has a large *bunch* shouldered; *berries* above medium, oval, black with a blue bloom; flesh very sweet, juicy and rich; vine healthy and productive.—*F. R. Elliott.*

One of the prettiest vines ever seen, filled with large bunches.—*Husmann.*

Raabe. Some say it is a hybrid between Labrusca and Æstivalis or Vinifera, but *Strong* describes it as a cross between Elsinburg and Bland, which is probably correct. Raised by Peter Raabe, near Philadelphia; thought to be hardy, but was only moderately vigorous, and proved quite unprofitable. *Bunches* small, compact, rarely shouldered; *berry* below medium size, round, dark red, thickly covered with bloom; flesh very juicy, with scarcely any pulp; flavor saccharine with a good deal of the Catawba aroma; quality "best."—*Ad. Int. Rep.*

Racine. (*Æst.*) Of similar origin as *Neosho*, and at first supposed to be the same grape, but afterwards recognized as distinct. We cannot admire either of these two varieties. They are both healthy and hardy, and have a beautiful durable foliage which makes them desirable for arbors, but we find neither of them very productive or desirable in quality. Its wine has a medicinal taste and flavor; the small berries are pulpy and full of seeds. They may be better in quality and sufficiently productive in some other localities.

Raritan. Ricketts' Delaware Seedling No. 1. A cross of Concord and Delaware. Plant moderately vigorous, hardy, short-jointed: *bunch* medium, shouldered, nearly the same form as Delaware; *berry* small medium, round, black; leaves of medium size, lobed, veined or corrugated: flesh juicy and vinous; ripens about the time of Delaware, and commences to shrivel as soon as ripe. Its originator, J. H. Ricketts, of Newburg, N. Y., claims that this is a superior wine-grape, its must coming up to 120° on Oechsle's scale in 1881, and 7½ mille by Twichell's acidometer. In 1871 Ricketts reported to the Am. Pomol. Society, 105° saccharometer, 9‰ acid; "of course, too much acid."

The vine does not grow vigorously on its own roots, and, according to Ricketts' experience, it grows best when grafted on the Clinton; but, according to our experience, the *invigorating* effect of the stock is not of many summers' duration (see Manual, page 37) unless care is taken to prevent the graft from making its own roots.

Ray's Victoria. See Victoria.

Rebecca. (*Lab.*) An accidental seedling, found (1856) in the garden of E. M. Peake, of Hudson, N. Y. It is a very fine white grape, but unfortunately very tender in winter and subject to mildew in summer, of weak growth, deficient foliage, not productive. On south walls, in well protected situations, with dry soil and good culture, it succeeds very well, and produces most delicious white grapes in some localities.

Bunches medium, compact, not shouldered; *berries* medium, obovate; skin thin, pale green, tinged with yellow or pale amber color at full maturity, covered with a thin white bloom, considerably translucent. Flesh tender, juicy, free from pulp, sweet with a peculiar musky and luscious aroma distinct from any other grape; seeds small; leaves of scarcely medium size, very deeply lobed, and sharply serrated. Suited to amateur culture, but, when tried on a large scale, in ordinary vineyard culture, as a hardy profitable grape, great disappointment followed and produced a decline in grape-growing.

Reliance. Parentage unknown. Exhibited in fall of 1881 by J. G. Burrows, Fishkill, N. Y. Resembles Delaware in size and color.

Rentz. (*Labr.*) A Cincinnati seedling, produced by the late Sebastian Rentz, a most successful vintner. Claimed to be equal, if not superior, to Ives. A large, rather coarse black grape, very vigorous and healthy in vine and foliage, free from mildew, and very productive. *Bunch* large, compact, often shouldered; *berry* large, round, black; flesh rather pulpy and musky, with abundant sweet juice. Ripens earlier than Ives Seedling, but is not good enough to be recommended. Berries drop from stem when ripe. Valuable as a stock for grafting. *Roots* thick, with a smooth, firm liber, readily pushing young rootlets, of strong resistance to Phylloxera; canes thick, but not very long, nor rambling.

Requa. (Rogers' No. 28.) A fine table grape. M. P. Wilder, who had a better opportunity than most men to form an accurate opinion of the merits of these hybrids, described it in the *Grape Culturist* as follows:

"*Vine* tolerably vigorous and quite productive: *bunch* large, shouldered; *berry* medium size, roundish; skin thin; flesh tender and sweet with a trace of the native flavor; color bronzy-green, assuming a dull brown red at maturity; season middle of September. A grape of fine quality, but subject to rot in unfavora-seasons."

Riesenblatt. (Giant-leaf.) A chance seedling of some Æstivalis grape that grows on M. Poeschel's vineyard at Hermann, Mo. The vine is hardy, healthy and productive; a strong grower, with a truly gigantic leaf. A small quantity of wine made from its grapes by Poeschel & Sherer has a Madeira character resembling Hermann: color dark brown.

This variety has not been disseminated, and consequently has not been extensively tried outside of Hermann, Mo.

Riesling or Missouri Riesling (*not* Reissling, as some incorrectly spell it). See Grein's Seedlings. Page 103.

Ricketts' Hybrids. Our Index contains a list of the very remarkable seedlings raised by J. H. Ricketts at Newburg, N. Y,, *as far as named* and disseminated by him. He has given his attention, for nearly twenty years, to raising new varieties by crossing, and by his long-continued, carefully and skillfully conducted labors has produced the most wonderful collection of hybrid grapes, embracing many hundred different sorts, mostly as yet unnamed and designated only by numbers. The American Pomological Society repeatedly awarded him its "WILDER SILVER MEDAL." At the Centennial Exhibition, 1876, he was awarded medal and diploma with a most flattering report of the judges; and hundreds of premiums, from Horticultural Societies all over the country, have been awarded to Mr. Ricketts for his seedling grapes.

There is no question about the beauty or the excellence of many of these grapes, and, though some have proved entire failures with us and others, especially in the Mississippi valley, the very fact that he brings for exhibition every year his magnificent specimens is evidence that they *can* be grown successfully in great perfection. His location may be specially favorable, but there must be other places equally so, where the same care and attention will produce the same splendid results. The soil of his vineyard is a medium loam, possessing a moderate degree of fertility, facing the east, sloping towards north-east, and sheltered by hills on the west. His vines are not pampered nor covered with glass, as some suppose, but merely laid down without covering for winter, pruned long and cultivated with but ordinary care. We have therefore, no reason to doubt that some of these excellent new varieties will become valuable acquisitions to our finest and most useful grapes, especially those which have the Concord for the pistillate parent, as the LADY WASHINGTON, EL DORADO, JEFFERSON, for the Atlantic and north central States; and those which are crosses on the Clinton, as the BACCHUS and EMPIRE STATE, for the middle and south central States, usually (though wrongfully) called the "western States."

Geo. W. Campbell justly remarks: "While much improved over the purely native varieties and succeeding well in some places—as Mr. Ricketts has abundantly demonstrated—in other and less favored localities they were injured by severe winter-freezing and suffered, in common with many of our natives, by mildew and rot in variable and unfavorable seasons. I have always hoped and believed that some of these remarkable grapes, or their successors, would be found adapted to general cultivation; and, even if they require a little more careful treatment than our hardiest natives of coarser mould, they are well worth the extra trouble, and their greater value will abundantly pay for it. A judicious selection of soil and situation, and perhaps protection during winter, and care as to training and pruning adapted to the habits of different varieties, may be necessary for complete success. Mr. Ricketts claims that his later productions are crosses between hardy natives, leaving out the foreign element."

Rochester. (*Labr.*) One of Ellwanger & Barry's seedlings. Not having as yet any vines in bearing of this new variety, we give their description of it: "*Vine* a remarkably vigorous grower; wood short-jointed and hardy; foliage large, yet resembles that of Delaware; the habits of the vine are similar to those of the Diana, and it requires ample room and rather long pruning. *Bunch* large to very large, shouldered, frequently double-shouldered, very compact; *berries* medium to large size, round, dark purple or purplish-lilac; peculiar, with thin white bloom; flesh very sweet, vinous, rich, and aromatic. Ripens usually the first week in September; has never failed to ripen well in the worst of seasons since it first bore." This description refers, of course, to the locality of Rochester, N. Y., where it was raised. We admired the fruit there, and consider this variety a valuable addition to the grapes of the Labrusca class.

Rommel's Seedlings. No person has been more successful in the production of valuable hardy and healthy seedling-grapes, adapted to general cultivation in a very large section of this country, than Jacob Rommel, of Morrison, Mo. His grapes cannot rival those of Rogers or Ricketts in beauty and in fine quality as a fruit for the table or for family use, but they far surpass them in vigor and productiveness, and are of fair to very good quality, especially for wine and brandy. Those named and disseminated are described in this Catalogue. See AMBER, BEAUTY, BLACK DELAWARE, ELVIRA, ETTA, FAITH, MONTEFIORE, PEARL, TRANSPARENT, WILDING.

But, besides these, he has raised and fruited for several seasons quite a large number of seedlings, from which he selects and recommends the following as fully tested and worthy of cultivation and dissemination:

(A) TAYLOR SEEDLING No. 9—Vine vigorous, healthy and hardy, moderately productive, free from mildew and rot; *bunch* medium, shouldered; *berry* medium to above medium, round; color black; ripens early, before Concord; quality excellent for a dark red wine.

(B) TAYLOR SEEDLING No. 18—Vine vigorous, healthy and hardy, very productive; *bunch* medium; *berry* above medium, amber color; quality excellent; ripens at same time as Catawba.

(C) TAYLOR SEEDLING No. 16—Vine a moderate grower, but healthy and sufficiently productive; *bunch* small; *berry* medium, very firm, of cream color; quality very good; ripens early, before Concord.

(D) ELVIRA SEEDLING No. 5—Vine vigorous, healthy and hardy, very productive; *bunch* above medium; *berry* medium, straw-color; quality good; ripens later, soon after Concord.

(E) ELVIRA SEEDLING, No. 6—Vine healthy and hardy, very productive; *bunch* medium to large; *berry* medium, color yellowish tinctured with red; of very fine quality.

(F) ELVIRA SEEDLING No. 8—Vine vigorous, healthy and productive; *bunch* large; *berry* medium, red, transparent, and of good quality; ripens just after Concord.

(G) DELAWARE SEEDLING No. 3—Vine very healthy, free from mildew and rot, perfectly hardy; *bunch* above medium, very compact; *berry* very firm, round, above medium in size, black; quality very good; promises to be a valuable early market grape, ripening before Hartford.

(H) DELAWARE SEEDLING No. 4—Vine a moderate grower, quite healthy and hardy; *bunch* and *berry* medium in size; in color like Delaware; quality very good; ripens before Hartford.

Rutland. Probably a cross between Eumelan and Adirondac. A new grape originated by D. S. Marvin, Watertown, N. Y. *Berry* and *bunch* medium, compact, not shouldered; color blue-black; fleshy, sprightly, vinous; skin thin; very good.—*Am. Pomol. Society Reports on New Fruits*, 1881.

Rogers' Hybrids. These were produced in a small garden in Roxbury, near Boston, Mass. When first fruited (in 1856), and long afterwards, they were designated by numbers only. Those of Rogers' valuable seedlings to which he has given names in place of numbers, by which they have hitherto been designated, have been placed, in alphabetical order, in their appropriate places,* but there are some remaining numbers yet unnamed which deserve a name.

No. 2. One of the largest of all his hybrids. *Bunch* and *berry* very large, dark purple, nearly black; thick-skinned and somewhat acid (ripening imperfectly with us, from loss of foliage, before maturing its fruit); *late* in ripening, and in flavor somewhat like the Catawba. Vine a vigorous grower and very productive, but here subject to rot.

No. 5. One of the finest of Rogers' hybrids, and deserving to be better known. *Bunch* medium to large, moderately compact; *berries* large, round, red, sweet and rich; free from foxiness, ripens early, and in quality one of the very best. Vine hardy and healthy, hardier and healthier than SALEM, which it resembles, but not as strong a grower as some others.

No. 8. Considered by us as one of Rogers' *best*, and valuable for wine-making purposes. *Bunch* and *berry* large; color pale red, but the fully matured berries a coppery-red with fine light gray bloom; flesh sweet, juicy, with pleasant flavor, and almost entirely free from pulp. Skin about the same thickness as Catawba. Vine a strong, vigorous grower, with broad, thick and coarse foliage; hardy and productive. Its fruit is ripening later than most of his other varieties, and its foliage, under good culture, less inclined to mildew; for these reasons it is the more appreciated and largely planted by some experienced wine-growers in Illinois, directly east of St. Louis.

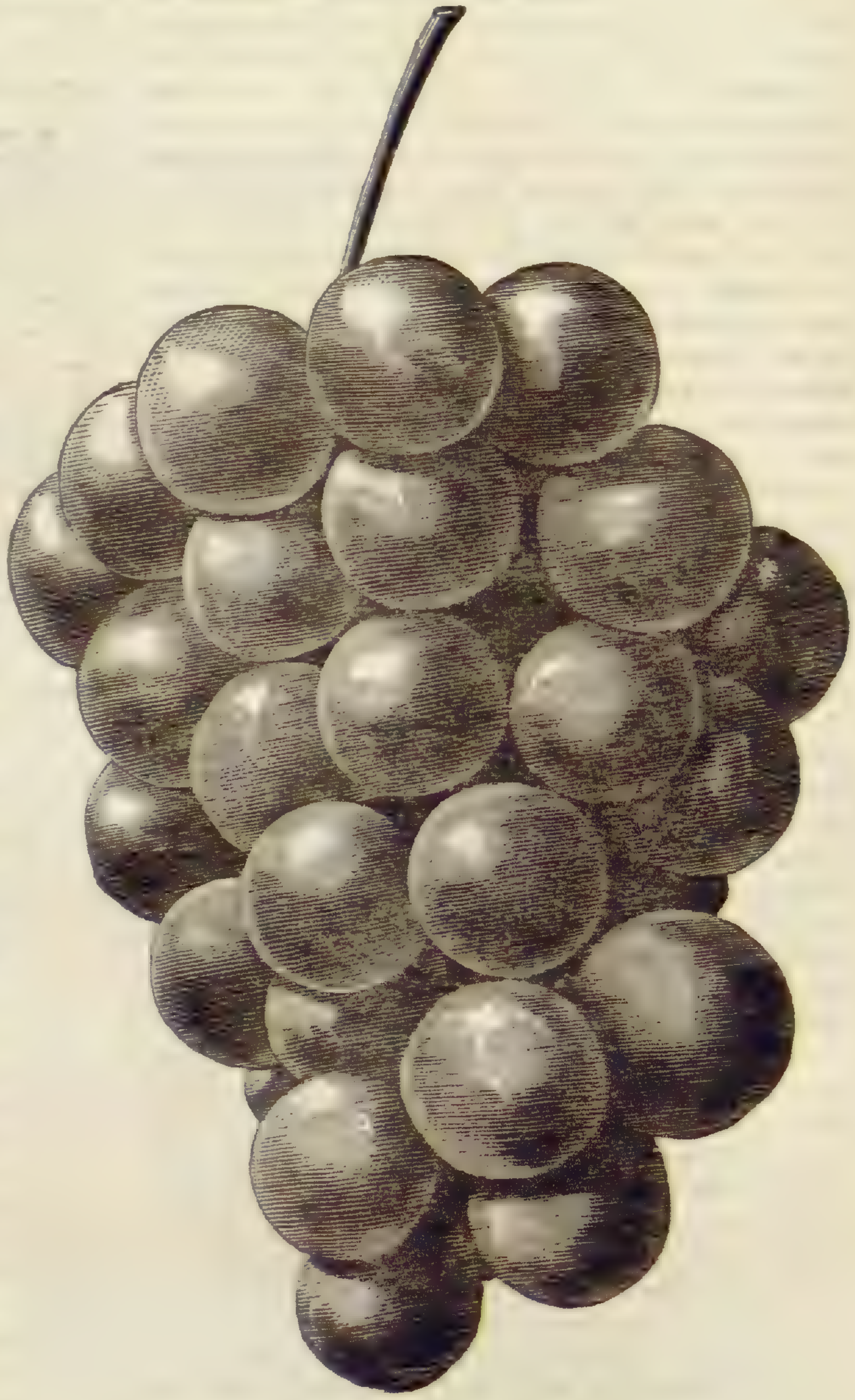
No. 30. Light red; *bunch* and *berry* very large: flavor very fine, much like the foreign Chasselas; pulp very tender. Vine vigorous and healthy. One of the best flavored of all the Rogers' grapes. Ripens early.—*Geo. W. Campbell.*

* No. 1, Goethe: No. 3, Massasoit: No. 4, Wilder: No. 9, Lindley; No. 14, Gaertner; No. 15, Agawam; No. 19, Merrimac: No. 28, Requa: No. 39, Aminia; No. 41, Essex; No. 43, Barry; No. 44, Herbert: No. 53, Salem.

Roenbeck. (*Hybrid.*) Parentage unknown. A chance seedling, originated on the grounds of Jas. W. Trask at Bergen Point, N. J. First fruited in 1870.

Bunches long, compact, well-shouldered; *berries* medium size; *color* pale green; skin thin and transparent; *flesh* melting and very sweet, no pulp.—Ripens about same time as the Concord. Wood short-jointed and light-colored; large fruit-buds. Vine hardy and prolific; fruit needs thinning out, as the vine, like Delaware, has a tendency to overbear. The foliage as well as other characteristics indicate *Vinifera* parentage, but its roots have, so far, not been attacked by the Phylloxera.

Fred. Roenbeck, of Centerville, Hudson Co., N. J., is propagating this variety, to sell after it may have been tried and proven satisfactory.



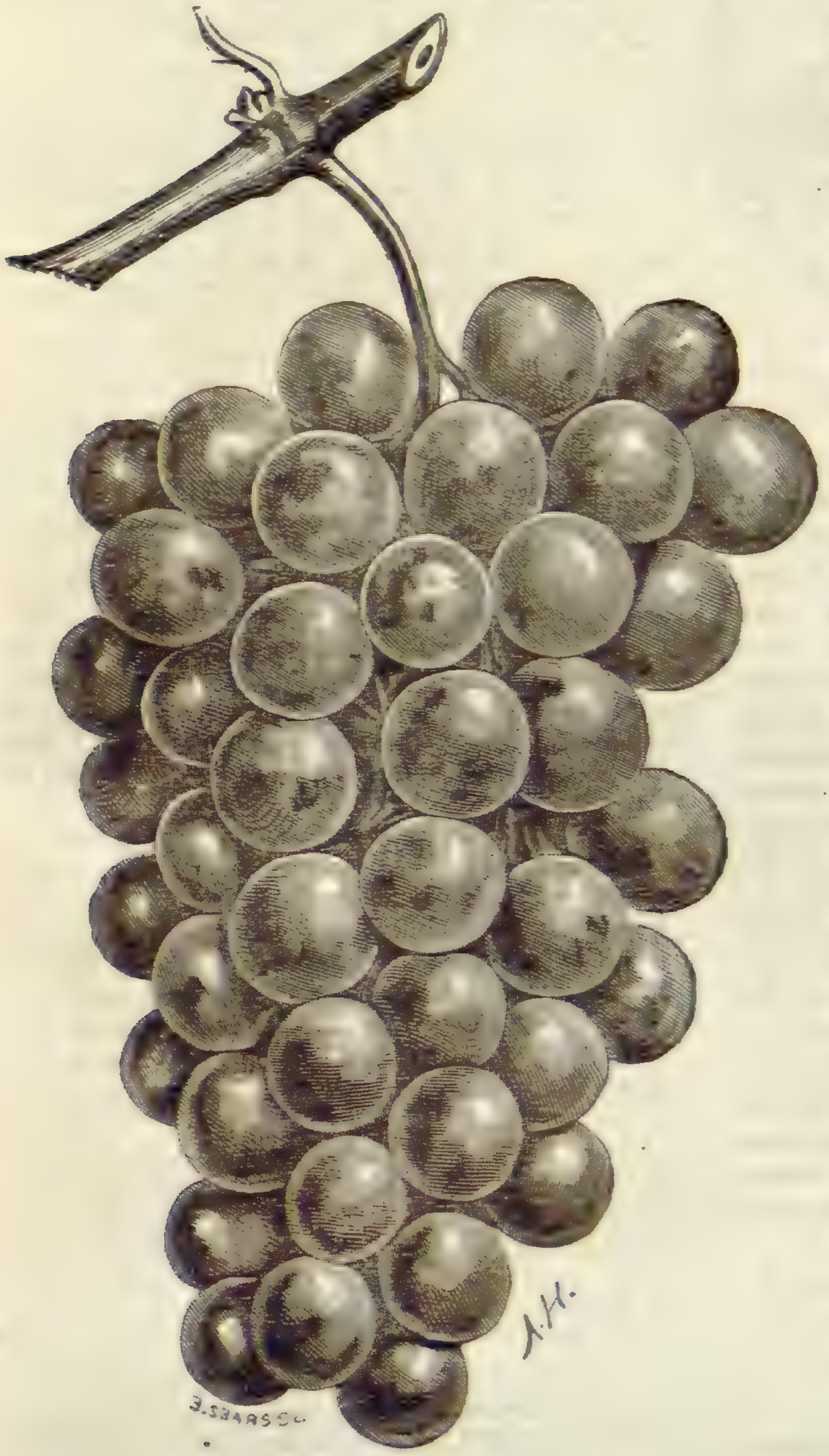
ROGERS' HYBRID. (No. 8.)

Rulander or St. Genevieve. Syn., AMOUREUX. RED ELBEN. (*Æst.* ×) What we call here the Rulander is not the same vine known by that name in Germany, but is claimed to be a seedling from a foreign grape (Pineau) brought by the early French settlers to the western bank

of the lower Mississippi (Ste. Genevieve). Others consider it as a native belonging to the southern division of the Æstivalis class; and, while we ourselves incline to this view, we must admit that its short-jointed growth, tenderness, and liability to suffer from diseases and Phylloxera, support the claim of its having originated from foreign (Vinifera) seed.

Bunch rather small, very compact, shouldered; *berry* small, dark purplish-black, without pulp, juicy, sweet and delicious. Vine a strong, vigorous, short-jointed grower, with heart-shaped, light green, smooth leaves, hanging on till late in November; very healthy, but requires covering in winter. It has very tough, strong *roots*, with a firm, smooth liber, but seems nevertheless subject to injury by Phylloxera; wood hard, with a small pith and firm outer bark; and although it will not bear *big* crops, it makes up in quality as a wine grape what it may lack in quantity. It makes an excellent pale red or rather brownish wine closely resembling sherry, which was repeatedly awarded a first premium as the best light colored wine. Must 100°–110°.

(See also LOUISIANA, page 118.)



THE SECRETARY GRAPE.

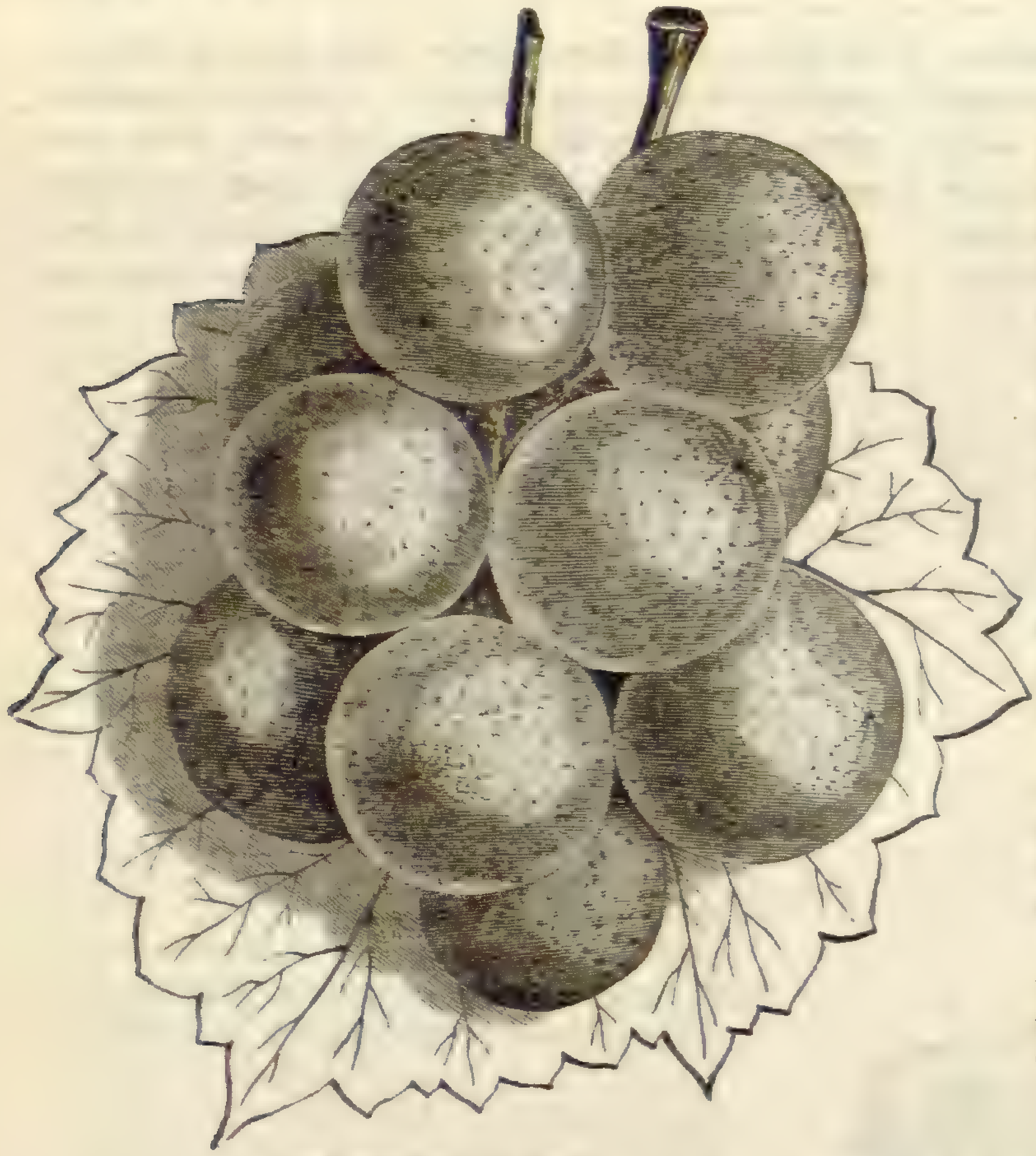
St. Catherine. (*Labr.*) Raised by Jas. W. Clark, Framingham, Mass. *Bunch* large, rather compact; *berries* large, chocolate color, rather sweet, tough, foxy. Not of much value.—*Downing.*

Secretary. Obtained by J. H. Ricketts, Newburgh, N. Y., by crossing the Clinton with Muscat-Hamburg. It was considered the finest new grape at the Massachusetts Horticultural Exhibition of 1872, and pronounced by Downing to be one of Ricketts' best in quality: but, being very much inclined to mildew, it will remain a superb amateur variety only.

Vine vigorous, hardy; *bunch* large, moderately compact, shouldered, with a large, roundish-oval *berry*, black with handsome bloom: its peduncle red at the base when drawn from the berry; flesh juicy, sweet, meaty, slightly vinous. Must 93° saccharometer; 7¼ per mille acid. Foliage like Clinton but thicker, and of about the same size.

Salem. (Rogers' No. 53.) Like Agawam (No. 15) and Wilder (No. 4), this is a hybrid between a native (Wild Mammoth), the female, and the Black Hamburg, the male parent. This is the most extensively planted and probably one of the finest among the Rogers hybrids; it has proven satisfactory where the hybrid grapes succeed, and, under favorable circumstances, produces a fine grape of excellent quality.

Bunch full medium to large, compact, and shouldered; *berry* large as Hamburg, ¾ inch in diameter, of a dark chestnut or catawba color; flesh tolerably tender, sweet, with rich aromatic flavor; a little foxiness to the smell, which is not perceptible to the taste; considered in quality one of the best; skin rather thick; seeds large; ripens nearly as early as Concord;



SCUPPERNONG.

it also keeps well. Vine very vigorous and healthy; foliage large, strong, and abundant; wood of lighter color than most of the Rogers grapes. The *roots* are of medium thickness, branching, with smooth, firm liber, and have more of the native character than most other hybrids; they seem to resist the Phylloxera as well as most Labrusca varieties. The Salem can be propagated from cuttings with remarkable ease, and its vigor of growth in the shoots has hardly a parallel among hybrids; it, nevertheless, generally fails in the valley of the Mississippi and wherever mildew prevails.

The SALEM grape was originally numbered 22; a spurious sort having been put into market under that number, it was changed by the originator to No. 53. But this did not help the confusion, and, to make it worse, he was reported to describe it once as of *black* color (Journal of Hort. vol. 5, page 264), and at another time as of chestnut or Catawba color, the latter generally adopted as the color of the true Salem.

Schiller. One of Muench's seedlings of the Louisiana. Vine hardy, a vigorous grower, healthy, and productive. Fruit of a purplish-blue color, but light juice; otherwise quite similar to his Humboldt. Not disseminated.

Seneca. Very similar to Hartford, if not identical with it. First exhibited at Hammondsport, N. Y., in October, 1867, by R. Simpson, of Geneva, N. Y. Not recommended.

Scuppernong. Syn., YELLOW MUSCADINE, WHITE MUSCADINE,* BULL, BULLACE OR BULLET, ROANOKE (*Vitis Rotundifolia*). This is purely and exclusively a southern grape; in South Carolina, Florida, Georgia, Alabama, Mississippi, and in parts of Virginia, North Carolina, Tennessee, and Arkansas, it is quite a favorite, producing annually large and sure crops, requiring scarcely any care or labor. It is entirely exempt from mildew, rot, or any of the diseases so disastrous to the northern species—entirely exempt also from Phylloxera; but it cannot be grown north of the Carolinas, Tennessee, and Arkansas, nor even in Texas.

G. Onderdonk, whose nurseries are farther south than any other in the United States, says about the Scuppernong grape, "we have repeatedly tried it, and as frequently failed."

In California also the *Scuppernong* refused to respond favorably. There "the vine makes a good growth, blossoms abundantly in June and July without setting a berry, and late in the season the leaves get rusty."—*J. Strenzel.*

We are aware that southerners deem it unjust partiality, if not an insult, to say anything against their favorite, the Scuppernong—"*a Divine gift,*"

"Sent in the night time of sorrow and care
To bring back the joy that the South used to wear."

Most heartily wishing that joy be brought back to our afflicted South, we would therefore refrain from any remarks in derogation of this Divine gift, and shall quote none but *southern authorities* and cultivators of the Scuppernong.

P. J. Berckmans, of Georgia: "I could not say too much in praise of the Scuppernong as a wine-grape. It is one of those things that never fail. *Of course I do not compare it with the Delaware and other fine flavored grapes;* but the question is—where, where shall we find a grape that will give us a profit? We have it in the Scuppernong. It cannot be grown as far north as Norfolk."

J. H. Carleton, El Dorado, Ark.: "The fruit is so healthy that it has never been known to make anyone sick, unless he swallowed the hulls, which are very indigestible. I made some Scuppernong wine last year with very little sugar (1¼ lbs. to the gallon must), and although the grapes were not near so ripe as they should have been, it has a fine body. * * * It is called by some the 'lazy man's grape.' I admit the charge, and prize it the more on that account."

John R. Eakin, Washington, Ark.: "I scarcely know what to say of this nondescript which is called a grape. It is a coarse, tough-skinned berry, with a sweetish, musky flavor. The vine takes care of itself; does not require and will not suffer pruning; bears abundantly and has no diseases. I scarcely think it a grape, but still a most useful fruit *sui generis*, and I hope will be cultivated by those who have no inclination for the more troublesome, and, I must say, the more exquisite 'bunch grapes,' as it is the habit of its friends to

*The black or purple grapes of this class are often *incorrectly* called "Black Scuppernong." Southern horticulturists designate them by different names: Flowers, Mish, Thomas, etc.

call the *Herbemont*, the *Catawba*, and others. Each to his taste."

The *Scuppernong* grape was discovered by the colony of Sir Walter Raleigh, in 1554, on the Island of Roanoke, N. C., and the original vine is said still to exist there, being over 300 years of age. In appearance, wood, fruit, and habit, it is entirely distinct, or "*unique*" as Mr. Van Buren calls it, saying: "There is a resemblance between the V. Vinifera, Labrusca, Æstivalis, Cordifolia; they will all intermingle, producing hybrids, but none of them can ever(?) be crossed with the V. Rotundifolia, which blooms two months later than either of the foregoing varieties. The odor of the Scuppernong when ripening is delicious, and entirely distinct from the nigger-stink of the Fox-grape family." The growth of the vine, or rather the space over which its branches extend in a series of years, is almost fabulous. The bark of the Scuppernong is smooth, of a grayish-ashy color, variegated with many small, dot-like specks of lighter hue; the wood is hard, close-textured, firm; the *roots* white or creamy. The leaves, before dropping in autumn, become of a brilliant yellow.

Bunch or cluster consisting usually of only about 4 to 6, rarely more, large, thick-skinned, pulpy berries; these are ripening in August and September, not all at the same time, but fall off successively, when ripe, by shaking the vine, and they are thus gathered from the ground. Color yellowish, somewhat bronzed when fully ripe. The pulp is sweet, juicy, vinous, with a musky scent and flavor—a delicate perfume to some tastes, repugnant to others. The French wine judges at the Congrès held in 1874 at Montpellier, pronounced all the Scuppernong wines there "fort peu agréable," some even "d'un goût désagréable." It has, however, its warm advocates among American grape-growers, as will be seen by the following, from a letter of S. I. Matthews, of Monticello, Ark., written for this Catalogue:

"The Scuppernong makes a splendid white wine; its fruit, though ordinarily deficient in sugar, is very sweet to the taste, owing to its having but very little acid. The saccharine deficiency may also be accounted for, in a measure, by the fact that this grape has been hitherto, for the most part, grown upon arbors, a plan of training that more effectually than any other excludes the sunlight and heat from the fruit, which it is the practice to gather by shaking down from the vines, whereby a considerable proportion of but partially ripe fruit is obtained. And yet, according to some tests, the Scuppernong has registered 88° on the (Oechsle) must scale, which would give 9 per cent. of alcohol.

"A. C. Cook, who was quoted in your Catalogue (ed. 1875) as saying that 'the Scuppernong is deficient in both sugar and acid, as it rates at about 10 per cent. of the first and 4 mills of the latter,' wishes to correct this, as he found since that time its saccharine properties to range occasionally as high as 18 per cent., and now thinks '*the Scuppernong is emphatically the grape for the South.*' Its juice is capable of being converted into the finest of Muscatelle sweet wines, or in superior light dry wines."

Mr. Matthews writes: "When it shall be planted on dry south hill-sides instead of on low moist bottoms; when it shall be trained on trellises, where the sun-heat, both direct and reflected from the ground, shall bathe the fruit and foliage, instead of upon tall umbrageous arbors through which the sun's rays can scarcely penetrate; and when only the perfectly ripe fruit shall be carefully hand-picked, instead of being rudely shaken and all berries that will fall gathered and pressed together, there will be little, if any, lack of sugar."

"But, even admitting this deficiency, it is the only demerit of this variety, and can be remedied either by adding pure sugar to the must, or by evaporating the water from a portion of the must and adding so much of the resulting syrup to the other as is needed to bring it up to the proper standard. Moreover, the true Scuppernong is the most productive and reliable grape for the *south*, and its cultivators plant therefore *mainly* of the Scuppernong and its class (the Thomas, Flowers, Mish, Tenderpulp), and of other grapes only a few, for variety or as an experiment."

Mr. Van Buren was evidently mistaken in supposing that Rotundifolia could not be hybridized with any of the other species, as the experiments of Dr. Wylie, of South Carolina, have proved. And it is another, though an oft repeated mistake, that the Scuppernong will not unite with grafts of other species. It is true that the Rotundifolia, imported to Southern France as a grafting-stock, on account of its phylloxera-*free* roots, did not succeed there; but several attempts to graft French vines on the Scuppernong (also on *Tenderpulp* and *Thomas*) were successful. The union may not be quite as perfect nor of as long durability as in other species with more affinity; but the legend of the anti-union character is dispelled—as many other viticultural and political legends.

Scuppernong Hybrids. (See *Wylie's* Seedlings.) At the meeting of the Am. Pom. Society held in Baltimore, 1877, Dr. A. P. Wylie exhibited his remarkable hybrids for the last time before his death; among them, the fruit committee—consisting of Chas. Downing of N. Y., Robert Manning of Mass., Dr. John A. Warder of O., Josiah Hoopes of Pa., P. J. Berckmans of Georgia, &c.—noticed "a most promising and *prolific Scuppernong*-hybrid (No. 4), from whose seedlings valuable results may derive." Its originator, Dr. A. P. Wylie, Chester, S. C., made of same the following note, Aug. 10, 1877:

"Prolific Scuppernong Hybrid No. 4. Grows in pipe-clay soil. *Wood* peculiarly slender, bears in clusters at each of its joints, never rots or mildews. *Bunches* medium, compact; produced in wonderful profusion; *berry* round, greenish-white, pulp half-dissolving; much juice, sprightly vinous with a peculiar musky aroma, unlike the *Scuppernong;* quality good. Maturity middle of August."

Solonis. A peculiar form of *Riparia*, somewhat distinguished from the ordinary form by the longer, sharply incised teeth of its foliage. Its home is probably in Arkansas; it is not and never was known or cultivated in this country, but is highly esteemed in France as an excellent grafting-stock for the reconstitution of their phylloxera-destroyed vineyards. (See the foot note on page 18.) Of late it seems much subject to that French rot, the anthracnose. It is mainly adapted for a moist sandy soil.

Senasqua. A hybrid raised by Stephen Underhill, Croton Point, N. Y., from Concord and Black Prince. Seed was planted in 1863 and the vine bore its first fruit 1865. *Bunch* and *berry* varying from medium to large; the bunch is very compact, so much so as to cause the berries to crack; color black with blue bloom; quality best. The fruit has the peculiar fleshy character of certain foreign grapes, with a brisk, vinous flavor. The vine is vigorous and productive in rich soil; moderately hardy. It is one of the latest to open its buds in spring, and thereby less subject to injury from late frosts; it nevertheless ripens early enough (here a few days later than Concord). The leaf is very large and firm, and shows no trace of foreign origin, except when it ripens, at which time, instead of the yellow of the Concord it takes on the crimson color of the mature leaf of the Black Prince. With us, at Bushberg, it did not succeed so well, and is not near as desirable as Underhill's other grapes, the Black Eagle and Black Defiance. Clay soil is not the best for Senasqua; it requires a light, deep soil. The originator himself does *not* recommend the Senasqua as a profitable grape for market purposes, but only as a fine and valuable amateur fruit. As such it is of first rank, "of the highest quality to those who appreciate life and brilliancy in a grape." In France (Drôme and Lot-et-Garonne) this variety is considered one of the most recommendable of American Hybrids, provided it be planted in the right soil and that it continues to resist the Phylloxera. We give in annexed figure, the likeness of a medium-sized cluster.

SENASQUA.

Sharon. A fine new grape, originated with D. S. Marvin, Watertown, N. Y. Probably also a cross between Eumelan and Adirondac. Said to be unsurpassed for a table-grape. Not yet disseminated nor known outside of its originator's place.

Silver-Dawn. (*Hybr.*) A seedling of *Israella* fertilized by pollen of Muscat-Hamburg, a brother of the *Early Dawn* out of the same bunch raised by Dr. W. A. M. Culbert, Newburgh, N. Y. A fine white grape of best quality; vine hardy and vigorous.

Not disseminated.

Stelton. (*Hybr.*) Raised by Thompson, of New Brunswick, and referred to in Gardeners' Monthly of Nov., 1882, as one of the many late brilliant appearances in the viticultural sky. The *bunches* are about eight inches long, well-shouldered, rather loose; *berries* white, about the size of *Croton*, and "not hard to take"; in flavor comparing favorably with Lady Washington. We have never seen it.

Talman's Seedling, or **Tolman.** Syn: CHAMPION. (*Labr.*) Grown in Western New York, as an early market grape. *Bunch* medium to large, compact, shouldered; *berry* large, black, adheres to the stem. Skin thick and firm; flesh sweet, juicy, somewhat pulpy, with foxy flavor; vine a very rank vigorous grower, perfectly hardy and healthy, and very productive; said to ripen a week earlier than Hartford: quality not good. The same variety was sent out under the name of "*Champion,*" as a new variety, but the two are identical. (See Champion, page 82.)

Taylor or **Bullit,** often called Taylor's Bullit. (*Riparia,* accidentally crossed with *Labr.*)

The often continuous tendrils, or rather *irregular* alternation of *more* than two leaves with tendrils, with often only a third or fourth leaf without such a tendril—further, the more prominent Labrusca character in many of the Taylor seedlings—make it almost certain that the Taylor is a cross between Riparia and Labrusca.

This old variety was first introduced to

notice by Judge Taylor, of Jericho, Henry County, Ky. It is generally considered very unproductive; it seems that the vines require age, and spur pruning on old wood, to make them produce well.

Samuel Miller suggests to plant the Clinton among Taylor to fertilize them, but we find the benefits resulting from this system also insufficient to balance its many inconveniences; and yet we have seen Taylor vines grown by themselves on the "Souche" plan (trained in the shape of a small weeping-willow tree, allowing the canes to grow from the short top of the main trunk, spur pruning in winter but not suppressing the growth by summer pruning) produce from 5 to 10 lbs. per vine. The *bunches* are small but compact, and sometimes shouldered; *berry* small, white to pale amber, turning even to pale red, like Delaware when perfectly ripe, round, sweet and without pulp. Skin translucent, very thin but tough. Vine a very strong, rampant grower, healthy and very hardy. It is now largely and most successfully used, in France, as grafting-stock for European vines, as a protection against the phylloxera; lately also in California. The Duchess of Fitz-James has 200 hectares (about 500 acres) in *Taylor* grafted with different varieties, all doing well. In some clayish limestone soils it seems not to do as well as in sandy clay, and especially in cool, moist grounds. *Roots* comparatively few, wiry and very tough, with a thin, hard liber. The young spongioles will push as rapidly as the Phylloxera can destroy them; hence this variety possesses great power of resistance to the insect. Its wine is of good body and fine flavor, resembling the celebrated Riesling of the Rhine. Some very valuable and promising seedlings of the Taylor are now introduced. See *Elvira*, *Noah*, *Grein's Golden*, *Amber*, *Pearl*, *Transparent*, *Montefiore*, *Missouri Riesling*, *Uhland*, &c.

Telegraph. (*Labr.*) A seedling raised by a Mr. Christine, near Westchester, Chester Co., Pa., named and introduced about 1865 by P. R. Freas, editor of the Germantown *Telegraph* (then one of the best agricultural papers in the East). An attempt was afterwards made to change its name to *Christine*, but did not prevail. Sam. Miller, of Bluffton, once considered it one of the most promising of all the new EARLY grapes, and we still consider it as far better than Hartford Prolific. *Bunch* medium, very compact, shouldered; *berry* medium, round to oval, black with blue bloom; flesh juicy, with very little pulp, spicy and of good quality; ripens almost as early as Hartford Prolific. A constant and reliable bearer, but often lost by rot, especially in the southwest; and when the rot spares our crop, the birds destroy it in preference to other varieties ripening at same time. Vine a healthy, vigorous grower in rich soil, and very hardy. Deserves more extensive planting in northern States, where rot is less destructive. *Roots* very abundant, heavy, with thick but rather firm liber. Canes stout, of average length, crooked at the joint, with the usual number of laterals. Wood hard with medium pith.

Theodosia. A chance seedling in the grounds of E. S. Salisbury, Adams, N. Y., said to be an Æstivalis. According to Mr. S. the *bunch* is very compact; *berries* black, in size between Delaware and Creveling, quite tart, very early, and claimed to be a good wine grape. But at a grape test held at Hammondsport, October 12, 1870, the report showed for Theodosia the lowest amount of sugar, 63½° by Oechsle's scale, with over 11 per mill. acid.

Thomas. (Rotund.) A variety of the *Scuppernong* species, discovered and introduced by Drury Thomas, of South Carolina, and thus described: "In color it varies from reddish purple to deep black: has a thin skin; sweet and tender flesh; is less in size than the Scuppernong, makes a fine wine, and is superior for the table. Ripens with the Scuppernong." Berckmans, of Augusta, Ga., describes it as follows: "Bunches from six to ten berries; berries slightly oblong, large, of a slight violet color, quite transparent; pulp tender, sweet, of a peculiar vinous flavor, quality superior to any of the type. Maturity middle to end of August. Has but little musky aroma and makes a superior red wine. A spurious variety is sold under the name of Thomas: this is inferior in quality and produces a deep black colored fruit of no merit whatever."

To-Kalon. Syn.: WYMAN, SPOFFORD SDLG., CARTER. (*Labr.*) Originated at Lansingburg, N. Y., by Dr. Spofford, and was at first supposed to be identical with the Catawba. C. Downing showed that it was entirely distinct and at first highly recommended it for general cultivation, but soon afterwards found that it drops its fruit, is inclined to rot, does not ripen well, and mildews badly, and so stated; admitting, however, that "this grape is very fine, when you can get it." *Bunch* medium to large, shouldered, compact; *berries* varying in form from oval to oblate, nearly black in color, and profusely covered with bloom; flesh sweet, buttery and luscious, without foxiness in its aroma and with but little toughness or acidity in its pulp. An early but a shy bearer.

Transparent. One of Rommel's Taylor Seedlings. *Bunch* small, compact and shouldered. *Berry* same size as Taylor, round, pale, greenish-yellow, *transparent*, gray spotted; skin thin, no pulp, very juicy, sweet and of fine flavor. Vine a very strong, rather long-jointed grower, resembling its parent in leaf and growth, but sets its fruit well; supposed to be free from mildew and rot, and promises to become a wine-grape of high character.

TRIUMPH
Engr. by J. Bolanz. Phila.

Triumph. (Campbell's Concord Hybrid No. 6.) Was justly pronounced by Samuel Miller, to whom Campbell confided this new variety for testing and propagation in Missouri, as *the most promising of all the white grapes*. It is a cross between Concord and Chasselas Musqué. (Syn., Joslyn's St. Albans.) It has retained, the vigor and general habit of foliage and growth of its parent; its fruit, however, is wholly free from any vestige of coarseness or fox flavor, or smell. *Bunch* and *berry* are very large; color white, or, more correctly, pale green to golden-yellow, nearly transparent with delicate bloom; skin thin, no pulp; flesh sweet, meaty; in unfavorable weather the berries are apt to crack (like Elvira); small seeds and few of them; ripens later than Concord, nearly as late as Catawba, and on that account not recommended for the North or for any locality where the season is too short to ripen the Catawba or Herbemont, but the more valuable farther South; quality first rate; vine healthy and hardy, very productive and free from disease, showing no rot when even Concord rotted more or less. Unfortunately the vines of this variety proved somewhat tender with us, suffering during severe winters if left unprotected. In the favorable season of 1880 the "Triumph" fully justified its name in our vineyards; it is by far the most attractive of all our white table grapes. Its bunches, grown by us in open air, with ordinary vineyard culture, are *very heavy*, and those exhibited at the great Miss. Valley Fruit Exhibition, held in Sept. 1880, at the St. Louis Merchants' Exchange, were so much admired as to be honored with the premium for "*the best plate of grapes for the table*," and there were over 200 varieties on exhibition! This created such a demand for plants of this splendid variety that it was impossible for several seasons to fill the orders. *Samuel Miller*, of Bluffton, Mo., writes that it is the finest table grape we have for open air cultivation, and his vines of "Triumph" stood the hard winter 1880–81 without injury. Yet we cannot recommend it for *general* cultivation in *our* variable climate, but only for those who will give it proper care and attention. We know of no grape more worthy of it than the "*Triumph.*"

P. J. Berckmans, Augusta, Ga., writes us: "*Triumph* is truly well named; for four years past it has proven to be the handsomest white grape we have, and of very good quality."

T. V. Munson, of Denison, Texas, pronounces it a great acquisition to the grapes of the south. "Had bunches weighing one-and-a-half pounds each, fine as Golden Chasselas in quality, vigorous and productive." One of these bunches was drawn from nature and painted by his sister, Miss M. T. Munson, an excellent amateur artist, and kindly presented to us. The annexed illustration is an exact copy, *slightly reduced in size*, showing also partly two leaves, one upper and the other lower face. But, excellent as the engraving is (which we had made for this Catalogue in the celebrated art establishment of A. Blanc, at Philadelphia), it can give but a faint idea of the beauty of this most beautiful American grape. The Triumph has lately also been tested in France; it succeeds there and pleases very much, while the Concord, one of its parents, does not succeed at all, and displeases the French taste.

T. V. Munson has a number of yearling hybrids between Triumph and Herbemont, of which he expects to get something fine for the south.

Uhland. (Riparia ×) A seedling of *Taylor*, grown by William Weidemeyer at Hermann, Mo. *Vine* a strong grower; long-jointed, grayish wood, with foliage resembling Taylor, but less vigorous; in some seasons of defective inflorescence, in others abundantly productive of excellent fruit, richer in sugar and flavor than most other Taylor seedlings, thus making a superior wine; but also considered more delicate, less robust, and requiring better soil and culture to obtain best results. *Bunch* medium, compact, sometimes shouldered; *berry* medium, slightly oblong, greenish-yellow in the shade, pale amber in the sun; skin thin, almost transparent, pulp tender, juicy, very sweet, of fine flavor. Ripens a few days after Concord.

Ulster Prolific. (*Labr.* ×) A new grape, originated by A. J. Caywood, of Marlboro, Ulster Co., N. Y., which attracted a great deal of attention at the meeting of the Am. Pomol. Society just held (Sept. 1883) at Philadelphia. The one branch there exhibited held fifty bunches and weighed twenty-two pounds. We received no description from the originator, and he does not offer any plants for sale.

Una. (*Labr.*) A white seedling, raised by E. W. Bull, the originator of the Concord. Not as good nor as productive as Martha. *Bunch* and *berry* small, of a very foxy flavor: not desirable.

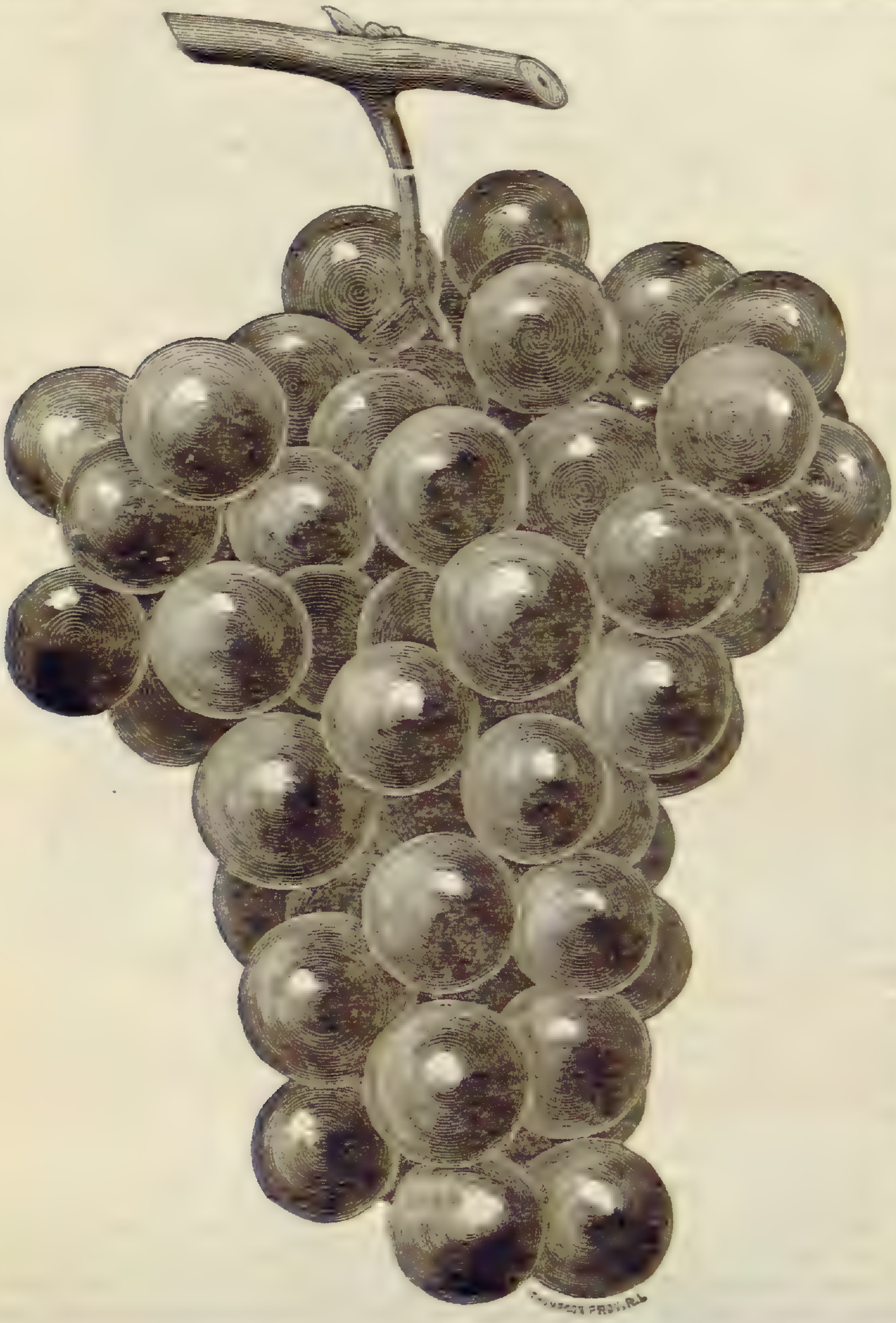
But the more desirable is the

Uno or **Juno,** a new grape which Geo. W. Campbell has just favored us with. It is not yet to be sent out, and we do not know whether we are permitted to say more than, that "it is really *unique*, richer in sweetness and better than any grape *you know*"; and that it seems to us a most valuable addition to our fine table grapes and a *new* TRIUMPH for friend Campbell.

Underhill. Syn: UNDERHILL'S SEEDLING, UNDERHILL'S CELESTIAL. (*Labr.*) Originated at Charlton, Saratoga Co., N. Y., by Dr. A. K. Underhill; pronounced as "of no more value than many other Fox-grapes" by Fuller, but considered by G. W. Campbell to be "of more value than the Iona for general cultivation." Now discarded by him also. *Bunch* medium to large, moderately compact; *berries* full medium, round, of Catawba color; pulp tender, sweet, rich and vinous, slightly foxy; ripens early, about with the Concord; vine a strong grower, hardy, healthy and productive. Not recommended by us.

Union Village. Syn., SHAKER, ONTARIO. (*Labr.*) Originated among the Shakers at Union Village, O. One of the largest of the native grapes we have, and one of the strongest growing vines. It is said to be a seedling of the Isabella, scarcely better in quality, but the bunches and berries are of the *size* of the Black Hamburgs. *Bunches* large, compact, shouldered; *berries* very large, black, oblong; skin thin, covered with bloom; flesh quite sweet when fully ripe, and of tolerably good quality. Ripens late and unevenly. Should be used as parent for new varieties in preference to Isabella. Vine is a coarse grower but tender; requires protection in severe winters; often unhealthy.

Urbana. (*Labr.*) *Bunch* medium, short, shouldered; *berry* medium to large, round, white-yellowish in the sun, juicy, vinous acid, hard centre, aromatic skin. Ripens about with Isabella.—*Downing.*



THE VERGENNES GRAPE.

Vergennes. (*Labr.*) A chance seedling, originated in the garden of Wm. E. Green, Vergennes, Vt.; fruited for the first time in 1874. *Clusters* large; *berries* large, round, holding firmly to the stem; color light amber, covered with a beautiful bloom; flavor rich, free from hard pulp; ripening *very* early and possessing superior keeping qualities. A most promising New England grape.

General Wm. H. Noble gives the following recommendation to the Vergennes:—"For hardiness, vigor of growth, large bounteous fruitage, a fruit of richest tint of blended pink and purple bloom; for its yield of wine with the most delicate aroma; for its early maturity of wood and fruit; for its long-keeping quality, I think this the equal of any American grape yet grown."

The Vergennes grape was exhibited at various horticultural meetings in Dec. and Jan., 1880 and 1881, and was yet in good condition and highly commended as possessing valuable qualities, an excellent keeper, and well worthy of further attention.

This variety is, so far, untried and unknown in the West. It seems worthy of a trial, as it is very early, of good quality; the *vine* a hardy, strong grower; the *leaf* large, downy, and free from mildew.

The accompanying engraving is a true copy from a photograph of a medium sized bunch.

Venango, or **Miner's Seedling.** (*Labr.*) An old variety, said to have been cultivated by the French at Fort Venango, on Alleghany river, more than 80 years since, but should be discarded now, when so many superior grapes can be grown. *Bunch* medium, compact; *berries* medium, round, often flattened by their compactness; color pale red, a fine white bloom; skin thick and tough; flesh sweet but pulpy and foxy. Vine a vigorous grower, very hardy, healthy and productive.

Vialla. (*Rip.*) A Franco-American variety, recommended as a grafting-stock; resembles the *Franklin*, and is by some supposed to be the same variety; others contend that it is distinct from and superior to *Franklin*, as also to *Clinton-Vialla*, the foliage of which is smaller, not as dark green, and that the Vialla produces more and better fruit. We incline to ascribe these differences to the effects of location, soil, &c. The president of the Agricultural Society of the Herault, in whose honor M. Laliman gave it that (his) name, does by no means claim the Vialla nor the Clinton-Vialla as his productions.

Victor. See *Early Victor.*

Victoria, Ray's. (*Labr.*) This variety has been introduced (1872) by M. M. Samuels, of Clinton, Ky., who describes it as follows: "*Bunches* and *berries* medium size, round, light amber color; skin thin; pulp tender, sweet, and highly flavored; vine perfectly healthy, an abundant bearer, and a good but not rampant grower." This grape has now been tested for a number of years in different parts of the south, and has, even under adverse circumstances, been free from both mildew and rot; it ripens there about the middle of August, and has been pronounced by some an excellent table grape, making also a good wine.

It resembles *Venango*, and belongs to the same form of *Labrusca* as that variety and *Perkins*.

Vivie's Hybrid, produced by M. Vivie in France, and by some called Vivie's Hartford; said to be of very vigorous growth, very productive, and its grape of good quality, making a very good wine.

Warren. See Herbemont.

Watertown. (*Hybr.*) Originated at Watertown, N. Y., by D. S. Marvin; a very good new white grape, of medium size in *bunch* and *berry;* slightly oblong; flesh breaking, sweet.—*Am. Pom. Society Report*, 1881.

Waverley. (*Hybr.*) One of Ricketts' first efforts in the production of seedling grapes; he has fruited it for twelve years, but has not propagated it, and now offers only grafts of same, wishing it tried in different localities. It is a seedling of the Clinton and one of the Muscats. *Vine* very vigorous, hardy, healthy and very productive; *leaves* moderately large, rather thick, slightly lobed, coarsely serrated; wood short-jointed; *bunch* medium, long, shouldered, compact; *berry* medium to large, oval, *black* with thin blue bloom; *flesh* crisp, juicy, sweet, vinous, refreshing. The bunches want thinning out considerably.

Ricketts considers it one of the best black grapes for amateur and family use.

Weehawken. Raised by Dr. Charles Siedhof, of North Hoboken, N. J., from a seed of a grape from the Crimea, *V. Vinifera.* A white grape of fine quality. Its foliage is very handsome, and decidedly foreign in character; its fruit fine; but only by grafting it on native roots, and careful nursing and covering in winter, can we obtain some of it in favorable seasons.

Welcome. (*Vinifera Hybrid.*) An exotic grape, raised by James H. Ricketts, being a cross between Pope's Hamburg and Canon Hall-Muscat. *Here* it can be grown in a cold or hot grapery only; for southern California, however, it may prove very successful. A vine planted at San Saba for testing shows a very vigorous growth, and the fruit is pronounced the very best; the *bunch* large, compact; the *berry* large, roundish-oval, black with a thick grayish bloom; flesh very tender, juicy, sweet, refreshing, vinous, rich, aromatic. A first-class grape in every respect.

White Delaware. A pure Delaware seedling, originated with George W. Campbell, of Delaware, O. The vine is in some localities more vigorous and robust in habit than the Delaware under the same conditions and circumstances; its foliage is large, thick and heavy, resembling that of Catawba more than Delaware. In flavor it seems equal to the old Delaware. Its main fault is want of size and productiveness; the *berries* and *bunches* will both rather fall below than go above the size of Delaware. In *form* of bunch and berry it is like the Delaware, compact and shouldered; color *greenish-white* with thin white bloom. Ripens early. Not very productive.

Another "White Delaware" seedling has been raised by Herman Jaeger, of Neosho; while the bunch and berries closely resemble the Delaware in shape and size, it has otherwise every characteristic of a *Labrusca.*

Whitehall. (*Labr.*) An early black grape, supposed to be a chance seedling, originated on the grounds of Geo. Goodale, in Washington Co., N. Y., and said to be nearly three weeks ahead of the Hartford Prolific. Merrell & Coleman, who have introduced this grape, describe the fruit to be of the size of the Isabella; *bunch* large and moderately compact, color dark purple; *berries* thin-skinned and adhering well to the stem: pulp tender, melting, and sweet. The vine is a good grower and hardy.

This variety may be worthy the attention of grape-growers in search of *very early* sorts. With us, here; it has proved neither very productive nor as early as was claimed for it.

White Muscat of Newburg. (*Labr.* ×) A seedling of *Hartford Prolific* fertilized by pollen from *Iona*, raised and exhibited in 1877 by Dr. W. A. M. Culbert, Newburg, N. Y. *Vine* hardy and a vigorous grower; *bunch* and *berry* of fair size. It has a fine Muscat aroma, or, rather, a toned-down foxiness.

THE WALTER GRAPE.

Walter. (*Labr.* ×) Raised by that enthusiastic horticulturist, A. J. Caywood, of Poughkeepsie, N. Y., crossing the Delaware with the Diana. From the many premiums awarded to this grape, from the favorable reports by all who have seen or tested it for wine, it might well claim to be a first-class grape, and to merit a trial. It labors yet under the disadvantage of having been represented as the climax of perfection by its originator. In justice to the latter, however, it must be admitted that he honestly believed all he claimed for his seedling, and has distributed the same with a liberality and a disinterestedness scarcely ever equaled by any originator of a new variety. It is now growing in almost every soil and location of this Union, and the opinions on its true merits and adaptability for general cultivation widely differ according to localities. In those where vines are much subject to mildew, the Walter cannot flourish, it drops its foliage, and is far from desirable; but in favorable localities, *especially where the Delaware succeeds well*, there the Walter may also prove desirable—a fair grower and a good bearer. Even in less favored localities it proved healthy and gave, for a few seasons, splendid results when grown on Concord or other vigorous roots, while on its own roots it failed.

In general appearance the characters of both parents, the Diana and Delaware, are discernible. The *bunch* and *berry* are in shape and color similar to Delaware, somewhat larger in size. The illustration was made after a perfet bunch, rarely equaled, exhibited by the originator. Flesh tender, rich, and sweet, with an agreeable spicy flavor, strongly reminding one of the Diana. The fruit is possessed of a most exquisite and delicate aroma, and a bouquet equaled by no other American grape that we know of. Quality best, both for table and for wine. Ripens very early, about the same time as Delaware. Vine, in moderately rich sandy soil, where free from mildew, a very fair grower, with dark brown short-jointed wood; large tough leaves, green on the upper and lower surface, not perceptibly woolly. Must 99° to 105°; acid 5 to 8 per mill.

Wilding. (*Rip.* × *Labr.*) One of Rommel's new seedlings, quite different from all his other grapes. *Vine* of a vigorous growth, hardy and healthy; *bunch* small to medium in size, loose, shouldered; *berries* very pale green, almost white, transparent, round, of full medium size, juicy, very sweet, no pulp; skin very thin and tender. Ripens with Concord. It is an exquisite grape for family use, yet unfit for marketing; it makes a very good wine.

Willis. Claimed to be from Delaware seed by its originator. W. W. Jones, Camargo, Ills., who sent this new grape to the 13th Ann. Meeting of the Ohio State Horticul. Society, Dec. 1879. The *bunches* of fair to good size, very compact, often conspicuously shouldered, and the *berry* of full medium proportions, round, and from pale green to amber yellow; flavor good; flesh very tender, no pulp, rich and sweet. It was considered promising, though as yet nothing is known, experimentally, of its behavior as to growth and productiveness in different soils.

On the fruit farm of the originator it has now yielded the tenth crop without rot or mildew, and went through the severe winter of 1880–81 unprotected; and in September, 1881, Prof. T. J. Burrill testified that not the least appearance of injury could be found. He described the *Willis*, as there seen: "of vigorous growth, not so rampant as Concord but producing about an equal amount of fruit; wood hard, joints inclined to be short; leaves remarkably thick and leathery, with a dense, dark-colored tomentum beneath. The vine has nothing of the appearance of foreign parentage—the fruit certainly has."

Wilmington(?). A white grape, originated near Wilmington, Del. *Vine* very vigorous, hardy; *bunches* large, loose, shouldered; *berries* large, round inclining to oval, greenish-white, or, when fully ripe, yellowish; flesh acid, pungent. Not desirable at the north; may be better south. Ripens late.—*Downing.*

Wilmington, Red. Syn., WYOMING, RED. (*Labrusca.*) Raised and disseminated by Dr. S. J. Parker, Ithaca, N. Y., and, according to Fuller, "nothing more than an early red Fox-grape, but little better than the old Northern Muscadine." The *Horticulturist*, of Nov. 1874, speaks of the *Wyoming Red* (probably the more correct name of Dr. Parker's red Fox-grape seedling) as being rapidly diffused and much in demand there as an *early* profitable grape. Said to be double the size of Delaware, which it resembles in appearance. *Bunch* small, compact, and handsome. *Berry* small to medium, bright red; skin thin and firm; flesh sweet, a little foxy, but not enough to be objectionable. Vine good grower, and very healthy and hardy. Unknown in the west.

Winslow. (*Rip.*) Originated in the garden of Charles Winslow, Cleveland, O. The vine resembles Clinton, is hardy and productive; the fruit matures very early, and is less acid than Clinton; *bunch* medium, compact; *berry* small, round, black. Flesh reddish tinge, some pulp, vinous, juicy.—*Downing.*

Woodriver Grape. Said to have originated near Woodriver, in Washington Co., R. I., by Mr. Brown. (See letter of Chas. A. Hoxie, Carolina, R. I., Sept, 13, 1880.) *White*, very early, fine quality.

Woodruff's Red. (*Labr.* ×) Originated with C. H. Woodruff, Ann Arbor, Mich., in 1874; a chance seedling, supposed to be a cross between Catawba and Concord. Ripens a little ahead of Concord. Vine a very strong grower, healthy and hardy; *leaf* as large as that of any known variety(?), leathery; free from disease in its original location; but little tried outside: *bunch* large, shouldered; *berry* in color and size similar to Salem. Said to be very promising.

WILDER. (Rogers' Hybrid No. 4.)

Wilder. (Rogers' Hybrid No. 4.) This is one of the most profitable and popular varieties for the market, its size and beauty being equaled by its vigor, hardiness and productiveness,—where rot and mildew are yet unknown, and admit of the successful culture of any hybrids.

Bunch large, often shouldered, sometimes weighing a pound; *berry* large, globular; color dark purple, nearly black, slight bloom. Flesh tolerably tender, with a slight pulp, juicy, rich, pleasant and sweet. Ripens with and sometimes earlier than the Concord, keeping for a long time. The vine is vigorous, healthy, hardy and productive; *roots* abundant, of medium thickness, straight, with a smooth, moderately firm liber. Canes heavy and long, with well-developed laterals. Wood firm, with a medium pith. The character of the cluster and leaf is shown in the annexed figure.

Many seedlings of the Wilder were raised and exhibited in 1879 by Hulkerson & Co., Oriel, Mich., which showed considerable variation in size and color of berries, ranging from deep blue-black to red; but none were considered improvements upon the parent.

Worden. Syn., WORDEN'S SEEDLING. (*Labr.*) **Raised by S. Worden, Minetta, N. Y., from Concord seed. In character and appearance like its parent, only a few days earlier in ripening, and in quality distinct from Concord, with a peculiar flavor;** *bunch* large, shouldered; *berry* large, black; **skin thin, flesh sweet, much like Concord, but generally regarded as a better grape. It is doing poorly in the south,** but desirable in the north-eastern or north Atlantic States, where it seems less subject to rot than the Concord. **It is now increasing in popularity.** (See Concord, p. 83.)

Wylie's New Grapes. "Too much can scarcely be said in praise of Dr. Wylie's persevering efforts in the improvement of the grape."—*P. J. Berckmans, Chas. Downing, Thomas Meehan, W. C. Flagg, P. T. Quinn*, Committee on Native Fruits, of the Am. Pom. Society. (Proceedings 1871, p. 54.)

This testimony, and the excellent character of these hybrids as regards flavor and general appearance, entitle them to special attention, and, although they have not been sufficiently tested, we give them a place in our Catalogue; most of them may never be disseminated, as their originator died in the fall of 1877. Few persons can appreciate the immense labor and perseverance which his experiments have cost. As early as 1859 he had raised many seedlings of Delaware and foreign; all have proven failures. Other hybrids which he produced by crossing Catawba, Isabella, Halifax, Union Village, Lenoir, Herbemont, with foreign, have nearly all failed—most of them from mildew and rot. In 1863 he had over one hundred promising seedlings; gave Rob't Guthrie, of York Co., S. C., about 65, mostly hybrids of *Halifax* and *Delaware*. These flourished, and never missed a full crop; but during the war, owing to the quartering of troops adjoining his lot, his vines were ruined. Thus there exist now but a few of those *Halifax* and *Delaware* hybrids, saved again by Mr. Guthrie.

In 1868 Dr. Wylie planted again one hundred seedlings, and, after many failures to produce seedlings of hybrid Scuppernongs, he finally succeeded; but, owing to a little hot-house being over-heated, he again lost nearly all of them. He commenced anew with his experiments and had hundreds of new seedlings growing, when they were cut down by a severe frost on the 27th of April, 1872—a frost which killed all kinds of grape-vines in that section. Again, in November, 1873, his residence was burned (no insurance), and consequently he had to leave his place to depredations from broken fences, &c. But it was soon rebuilt, and Dr. Wylie went back again to his old place, experimenting and working with the same zeal and enthusiasm as ever, wishing "*if I were only young again—with the experience I have!*"

We extract the following Description of some of his Hybrids from Mr. Wylie's letters to us:

Jane Wylie. (Parentage, Clinton and Foreign.) *Bunch* and *berry* very large; berries nearly one inch in diameter; quality *best*, resembling foreign in texture and flavor; ripens early and hangs long; might require winter covering in your climate and farther north.

Mary Wylie. (*Hybr.*) (Parentage, Clinton and Foreign.) (Red Frontignac) White, slightly red on cheek; resembles White Chasselas; *bunch* large: *berries* above medium; not as early as Jane Wylie; wood and foliage NATIVE; seems quite hardy, and is of highest quality.

—— **No. 4.** A cross between two hybrids. *Bunch* somewhat larger than Lenoir; *berry* medium, of a clear transparent golden color; finest texture and flavor, resembling White Frontignac; ripens as early as Concord; native foliage, but ahead of all American grapes in quality; considered of the highest excellence by Downing, Saunders, Meehan, and others.

—— **No. 5.** (See "Berckmans," page 75.)

Garnet. (Red Frontignac and Clinton.) *Bunch* and *berry* larger than Clinton; of a beautiful deep garnet color; flavor and texture foreign, but native foliage.

Concord and Foreign (Bowood Muscat) **No. 8.**—Black; *bunch* and *berries* very large and loose; skin thick; texture foreign; flavor slightly musky. A strong grower, with large Labrusca foliage. Ripens as late as Catawba.

Halifax and Hamburg No. 11. Black; *bunch* and *berry* medium size; skin thick; only valuable on account of its extreme productiveness and health; has never rotted in ten years.

Peter Wylie No. 1. (Parentage, *f.* Halifax and Foreign. *m.* Delaware and Foreign.) White; transparent, becoming golden-yellow when fully ripe; *bunches* and *berries* above medium size, between Delaware and Concord, excellent in quality and meaty, with a peculiar delicate Muscat flavor. A vigorous, short-jointed, rapid-growing vine, with thick native leaves: holds its leaves until fall and ripens its wood thoroughly. (Also *Peter Wylie No. 2*, produced from seed of *P. W. No. 1.*)

Robert Wylie. Blue; *bunch* large and long; *berry* large; skin thin; rich and juicy: ripens as late as Catawba. A great bearer, one of my best: but it may not be quite hardy, as the wood is not very hard.

Gill Wylie. (Concord and Foreign.) Blue; *bunch* large, loose, and much shouldered; *berry* large, oblong: texture soft and rich. Ripens with Concord, but altogether superior. Intensely Labrusca in foliage, which has much red pubescence, is laciniated, and clear of all disease. Considered of *great promise.*

Delaware and Concord No. 1. Dark red; *bunch* and *berry* medium; skin tolerably thick; juice rich and sweet, slightly musky. Vine very hardy, with Labrusca foliage: a great bearer, never fails, and may make a fine wine grape.

Hybrid Scuppernong No. 4. (See *Scuppernong.*)

Hybrid Scuppernong No. 5. (Parentage, *f.* Bland Madeira and Foreign No. 1, *m.* Staminate Hybrid Scuppernong: produced by impregnating Black Hamburg with Scuppernong.) So, you see, it is only a quarter-blood Scuppernong. I have never yet had a half-breed Scuppernong to bear perfect fruit. The vine is healthy and hardy here; it bears a *white*, transparent fruit. *Bunch* medium; *berries* large; skin thin but tough; almost pulpless, rich, sweet,

with a peculiar flavor; appears to ripen its berries together (as early as Concord) and adhere well, which some of the hybrid Scuppernong do *not*. I think it may suit your climate; it is certainly worthy of a full trial.

Halifax and **Delaware No. 30.** Color of Delaware; *bunch* about same size; *berries* one-half larger; texture and flavor also much like Delaware, but holds (here) its leaves better, and is healthier generally, with leaves somewhat hoary underneath. A great bearer.

Halifax and **Delaware No. 38.** Of deeper red color than the former and of superior flavor, but not as strong a grower as No. 30. Wood hard, leaves hoary, and ferruginous (rusty) underneath. Mr. Guthrie tells me that this variety was the most preferred among about 80 Hybrids he had bearing.

Halifax and **Hybrid No. 55.** Blue, like Halifax, but high-flavored, tender and very sweet; *bunch* and *berry* larger than Nos. 30 and 38. I think it will prove a great acquisition.

I have sent you nearly all of my hybrids that may be sufficiently hardy for your climate. I still continue to hybridize, more or less, every year.

A. P. WYLIE.

Wyoming-Red. See WILMINGTON-RED.

York Madeira. Syn., BLACK GERMAN, LARGE GERMAN, SMALL GERMAN, MARION PORT, WOLFE, MONTEITH, TRYON. An old variety, generally supposed to be a seedling of Isabella; originated at York, Pa. French viticulturists classify it as a *hybrid*. MARÈS finds in the structure of its roots great analogy with the Æstivalis, and that it is difficult to classify. *Bunch* medium sized, compact, and generally has a small shoulder; *berry* of medium size, roundish-oval, black thickly covered with a light bloom; juice slightly reddened, sweet, vinous, not very rich; skin somewhat pungent, and not much toughness in its pulp when fully ripe, which is about same time with Isabella. The vine is not very hardy, short-jointed, moderately vigorous and productive, but often losing its leaves, and consequently failing to ripen its crop.

Charles Canby, of Wilmington, Del., introduced the same variety as *Canby's August*. *Hyde's Eliza* (Catskill, N. Y.) is probably also the same grape.

The "York Madeira" is now almost entirely discarded and but rarely found in its native land, America, but in FRANCE it has obtained a certain importance and celebrity. M. Laliman, of Bordeaux, first recommended it as remarkably free from phylloxera and worthy of propagation, and it was found to adapt itself very well to various soils. Though its fructification is not satisfactory in quantity, its grapes gain under that climate in richness of color and sweetness, and its vigorous growth recommends it as a grafting-stock; but as such also it is inferior to the *Riparia*.

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II. INDEX TO DESCRIPTION OF VARIETIES.

The Standard names are in SMALL CAPITALS, (the most prominent or leading varieties in LARGE CAPITALS); the Synonymous names in *Italics;* Discarded old varieties and undisseminated novelties are in ordinary Roman type. **Varieties marked by a * are illustrated.**

The columns explain as follows:

1st. SEASON and USE: e., early; v. e., very early; m., medium; l., late; v. l., very late:—T., table; M., market; W., wine. *a*, for amateur-culture; *gr.*, for grafting stock; *d.*, discarded; *n.*, new; §, not disseminated or but little known; *x*, EXTRA, **recommended for its proper location and soil.**

2d. SIZE and COLOR, with reference to the berry, are designated as follows:

● ● • black, or nearly so, when fully ripe.
◍ ◉ reddish, or coppery brownish; amber.
○ ○ ° greenish white, or yellowish.

} The size of these signs being large, medium or small, to denote the size of the berry.

3d. NAMES of Varieties with their classification, referring to their species, or whether they are crosses or hybrids.

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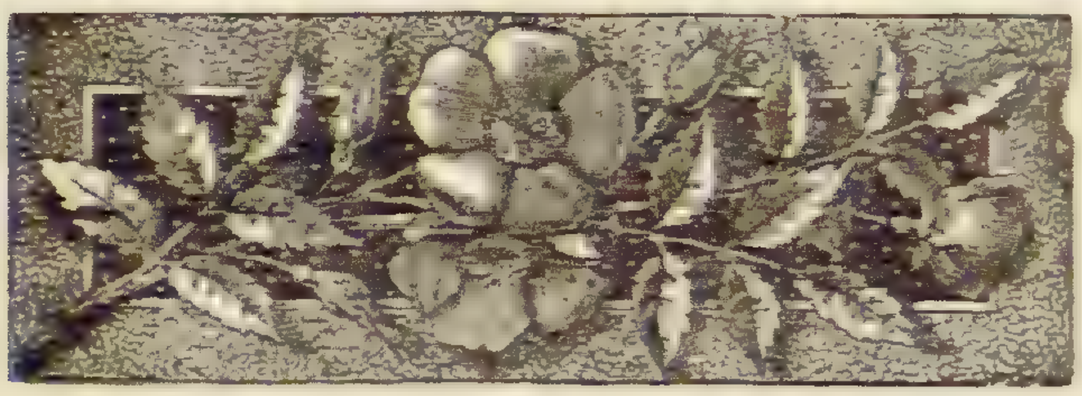

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THE BUSHBERG

ILLUSTRATED DESCRIPTIVE CATALOGUE of AMERICAN GRAPE VINES.

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Leading Varieties of Grapes.

The following List includes those Am. Varieties which have been well tested and are now cultivated in Vineyard. Single Vines at one tenth the price per dozen.

Season, Use.	Size color	NAME OF VARIETY AND CLASS. *Æst.* (Æstivalis), *Rip.* (Riparia), *Lab.* (Labrusca), *Hyb.* (Hybrid).	One Year, No. 1.			Two Years or Extra.		
			Per Doz.	Per 100.	Per 1000.	Per Doz.	Per 100.	Per 1000.
			$ cts	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
m. T.	◍	AGAWAM, (Rogers' No. 15.) *Hyb.*	2 00	7 50	60 00	2 50	12 00	90 00
e. T.	●	BLACK EAGLE..... "	3 00	15 00		4 00	22 50	
m. T. W.	◍	BRIGHTON.....*Lab.*	2 50	12 50		4 00	30 00	250 00
T. w. W.	◍	CATAWBA.....*Lab.*	1 50	5 00	40 00	2 00	8 00	60 00
e. T.	●	CHAMPION, or Talman.....*Lab.*	1 50	6 00	45 00	2 50	10 00	80 00
r. W.	●	CLINTON .....*Rip.*	1 00	3 00	22 00	1 50	4 50	35 00
m. T. W.	●	**CONCORD** .....*Lab.*	1 00	3 00	**24 00**	1 50	4 50	**35 00**
e. T.	●	COTTAGE .....*Lab.*	1 50	5 00	40 00	2 00	8 00	60 00
. w. W.	●	CUNNINGHAM.....*Æst.*	2 50	12 50	100 00	3 50	15 00	140 00
l. r. W.	●	**CYNTHIANA**.....*Æst.*	3 00	16 00	140 00	4 00	20 00	175 00
e. T. w. W.	◍	DELAWARE.....*Hyb.*	2 50	14 00	110 00	3 00	18 00	160 00
l. T. w. W.	◍	DIANA .....*Lab.*	2 00	7 50	60 00	2 50	12 00	90 00
w. W.	○	**ELVIRA,** (Rommel's) .....*Rip.*×	1 50	6 00	**45 00**	2 00	8 00	**60 00**
e. T. r. W.	●	EUMELAN .....*Æst.*	2 50	12 50		3 50	18 00	
l. T. w. W.	○	GOETHE, (Rogers' No. 1.) ..*Hyb.*	2 00	7 00	50 00	2 50	10 00	80 00
e. M.	●	HARTFORD PROLIFIC....*Lab.*	1 00	4 00	27 50	1 50	6 00	45 00
l. w. W.	●	HERBEMONT.....*Æst.*	2 50	12 00	100 00	3 50	18 00	
m. T.	●	HERBERT, (Rogers' No. 44). *Hyb.*	2 50	12 00		3 50	18 00	
l. w. W.	●	HERMANN ....*Æst.*	3 00	15 00		4 00	20 00	
l. T. w. W.	◍	IONA .....*Lab.*	2 00	7 50	60 00	2 00	12 00	90 00
l. M. W.	●	ISABELLA.....*Lab.*	2 00	7 50		2 50	12 00	
e. M. r. W.	●	**IVES**.....*Lab.*	1 00	3 00	**24 00**	1 50	4 50	**35 00**
e. T.	○	LADY (Campbell's) .....*Lab.*	3 00	15 00	120 00	4 00	20 00	
m. T.	◍	LINDLEY, (Rogers' No. 9.) ..*Hyb.*	2 00	7 00	50 00	2 50	12 00	100 00
m. w. W.	●	LOUISIANA .....*Æst.*	3 00	15 00		5 00	25 00	
m. T. w. W.	○	**MARTHA**.....*Lab.*	1 50	5 00	**40 00**	2 00	9 00	70 00
e. T.	◍	MASSASOIT, (Rogers' No. 3) *Hyb.*	2 00	8 00		2 50	12 50	
m. T. w. W.	○	MISSOURI RIESLING (Grein's) *Rip*×	2 00	8 00	65 00	2 50	12 50	110 00
l. T.	●	MERRIMACK, (Rogers' 19.) *Hyb.*	2 00	8 00		2 50	12 50	
m. T. w. W.	○	NOAH (Wasserzieher's)...*Rip.* ×	2 00	8 00	65 00	2 50	12 50	110 00
l. r. W.	●	**NORTON'S Va**.....*Æst.*	2 50	15 00	125 00	3 50	18 00	150 00
e. T.	○	PERKINS.....*Lab.*	1 50	6 00	50 00	2 50	12 00	90 00
m. T. w. W.	●	RULANDER, or St. Genevieve *Æst.*	2 50	12 50		3 50	18 00	
m. T. w. W.	◍	SALEM, (Rogers' No. 53.)...*Hyb.*	2 00	7 50	60 00	2 50	12 00	90 00
l. w. W.	○	TAYLOR'S BULLIT.....*Rip.*×	1 00	3 00	20 00	1 50	4 50	35 00
e. T.	●	TELEGRAPH .....*Lab.*	2 00	7 50	60 00	2 50	12 00	90 00
m. M.	◍	VENANGO, or Miner's Seedl'g "	2 00	8 00		2 50	12 50	
m. T. W.	●	WILDER, (Rogers' No. 4.) ..*Hyb.*	2 00	7 50	60 00	2 50	12 00	90 00

The columns explain as follows: *Season and Use.*—e. early, m. medium, l. late. T. or M. for Table or Market, w. W. for White Wine, r. W. for Red Wine.

Size and *Color* are denoted by the signs: ● for black, or nearly so when fully ripe. ◍ for red, purple, or coppery-brownish; ○ for white, amber, greenish, or yellowish. These signs are larger or smaller with reference to size of the berry.

Additional List of Grapes.

This List embraces the most *promising Novelties* and *varieties*, not yet sufficiently known, or esteemed only in *particular localities* and for *amateur collections*.

Season, Use.	Size color	NAME OF VARIETY AND CLASS. *Æst.* (Æstivalis), *Rip.* (Riparia,*) *Lab.* (Labrusca), *Hyb.* (Hybrid).	One Year, No. 1. Each	Per Doz.	Per 100.	Two Years, or extra Each	Per Doz.	Per 100.
r. W. e. T.	●	ALVEY.....*Hyb*	30	2 50	10 00	40	3 50	
m. T. w. W.	◍	AMBER (Rommel's).....*Rip.* ×	30	2 50	10 00	40	3 00	15 00
e. T.	●	AMINIA (Rogers' No. 39).....*Hyb.*	40	3 50				
m. r. W.	●	BACCHUS (Rickett's).....*Rip.* ×	30	3 00	15 00	40	4 00	25 00
e. T.	●	BARRY (Roger's, No. 43).....*Hyb*	35	3 00	15 00	50	4 50	
e. M.	●	BELVIDERE.....*Lab*	30	2 50	10 00	40	3 00	15 00
e. M.	●	BLACK HAWK.....*Lab*	30	2 50	12 50	40	3 50	18 00
l. T.	●	BLACK DEFIANCE.....*Hyb.*	40	4 00	20 00	60	6 00	30 00
m. r. W.	●	BLACK PEARL (Schraidt's)....*Rip.*	30	2 50	10 00	40	3 00	15 00
e. T.	●	BRANT.....*Hyb*	35	3 00	15 00	50	4 50	25 00
r. W.	●	BLUE DYER.....*Rip*	30	2 50	12 00	50	4 50	25 00
m. T.	●	CAMBRIDGE.....*Lab.*	40	4 00	20 00	60	6 00	30 00
e. T.	●	CANADA (Arnold's No. 16)....*Hyb.*	35	3 00	15 00	50	4 50	
e. T.	◍	CHALLENGE.....*Lab.* ×	35	3 00	15 00	50	4 50	25 00
m. T.	●	CONQUEROR.....*Hyb.*	35	3 00	15 00	50	4 50	25 00
m. T. W.	●	CORNUCOPIA (Arnold's No. 2) *Hyb.*	35	3 00	15 00	50	4 50	25 00
e. T.	●	CREVELING.....*Lab.* ×	30	2 50	12 50	50	4 50	
e. T.	○	CROTON.....*Hyb.*	50	4 00	25 00	60	6 00	
l. r. W.	●	DEVEREUX OR BLACK JULY... *Æst.*	35	3 00	15 00	50	4 50	25 00
e. M.	◍	DRACUT AMBER.....*Lab.*	30	2 50	12 00	40	3 50	18 00
e. T. W.	●	ELSINBURG.....*Æst.*	35	3 00	15 00	50	4 50	
e. T.	●	ESSEX (Rogers' No. 41).....*Hyb.*	35	3 00	15 00	50	4 50	
e. T.	○	EVA.....*Lab.*	35	3 00	15 00	50	4 50	25 00
e. T.	○	FAITH (Rommel's).....*Rip.* ×	50	4 00	20 00	60	6 00	
m. T. w. W.	◍	HUMBOLDT (Muench's) ....*Rip.* ×	35	3 00	15 00	50	4 50	25 00
e. T.	●	ISRAELLA.....*Lab.*	35	3 00	15 00	50	4 50	
e. T.	●	JANESVILLE.....*Rip.* ×	30	2 50	12 00	40	3 50	
m. r. W.	●	LENOIR (Jaquez).....*Æst.*	35	3 00	15 00	50	4 50	25 00
m. T. r. W.	●	MARION.....*Rip*	30	2 50	12 00	40	3 00	15 00
m. T. w. W.	○	MAXATAWNEY.....*Lab.*	35	3 00	15 00	50		
e. T.	●	MILES.....*Lab.*	35	3 00	15 00	50	4 50	
e. T.	●	MOORE'S EARLY.....*Lab.*	50	4 50	25 00	60	6 00	40 00
l. W.	●	NEOSHO (Muench's).....*Æst.*	75	7 50		1 50	15 00	
. T.	●	NEW HAVEN.....*Lab.*	40	3 50				
e. T. W.	◍	NORTHERN MUSCADINE.....*Lab.*	35	3 00	15 00	50	4 50	25 00
e. T. w. W.	●	NORTH CAROLINA.....*Lab.*	30	2 50	12 00	40	3 00	15 00
l. T.	●	OTHELLO.....*Hyb.*	50	4 00	20 00	60	6 00	30 00
m. T.	◍	PETER WYLIE.....*Hyb.*	75	7 50				
m. T.	○	REBECCA.....*Lab*	35	3 00	15 00	50	5 00	
m. T. r. W.	●	RENTZ.....*Lab.*	30	2 50	12 50	40	3 50	18 00
m. T.	◍	REQUA (Rogers' No. 28).....*Hyb.*	35	3 00	15 00	50	4 50	25 00
m. T.		ROGERS' HYB., No. 5, 8, 24, 30, &c. *Hyb*	35	3 00	15 00	50	4 50	25 00
m. T.	●	SENASQUA.....*Hyb.*	50	4 50	25 00	60	6 00	
m. w. W.	○	TRANSPARENT (Rommel's).*Rip.* ×	50	4 00	20 00	60	6 00	
l. T.	○	TRIUMPH (Campbell's).....*Hyb.*	60	6 00	35 00	1 00	9 00	55 00
w. W.	○	UHLAND (Weydemeier's)....*Rip.* ×	30	2 50	10 00	40	3 00	15 00
e. T. w. W.	◍	WALTER.....*Hyb.*	60	6 00	40 00	1 00	10 00	
e. T.	●	WHITEHALL.....*Lab.*	50	4 50	25 00	60	6 00	40 00
m. T. W.	○	WILDING (Rommel's)..... *Rip.* ×	50	4 00	20 0	60	6 00	
e. T.	●	WORDEN'S SEEDLING.....*Lab.*	30	3 00	15 00	40	4 00	

*RIPARIA, and *not Cordifolia*, as eminent Botanists have now more fully established the distinguishing characteristics of the two classes.

SPRING 1884. # Desirable New Grapes. **SPRING 1884.**

Season, Use.	Size color	NAME OF VARIETY AND CLASS.	One Year, No. 1. Each	Per Doz.	Per 100.	Two Years, or Extra. Each	Per Doz.	Per 100.
m. T. w. W.	◍	BEAUTY (Rommel's).....*Lab.*×	35	3 00	15 00	50	4 00	25 00
e. T.	○	DUCHESS .....*Hyb.*	60	5 00	30 00	1 00	9 00	50 00
e. T.	●	EARLY VICTOR .....*Labr.*	1 00	9 00	50 00	1 25	12 50	75 00
m. T. W.	○	ETTA (Rommel's) .....*Rip* ×	1 50	15 00	100 00	2 00	20 00	
m. T. w. W.	○	GREIN'S GOLDEN..... *Rip.*×	35	3 00	15 00	50	4 00	25 00
m. T.	●	HIGHLAND (Rickett's) .....*Hyb.*	75	6 00	40 00	1 00	9 00	
m. T.	◍	JEFFERSON (Rickett's).....*Hyb*	75	6 00	40 00	1 00	9 00	
m. T.	○	LADY WASHINGTON (Rickett's) *Hyb.*	65	6 00	35 00	1 00	9 00	50 00
e. T. w. W.	○	MASON'S SEEDLING.....*Lab.*	75	6 00	40 00	1 00	9 00	
m. r. w.	●	MONTEFIORE (Rommel's)...*Rip.*×	65	6 00	35 00	1 00	9 00	50 00
m. T.	○	NAOMI (Rickett's).....*Hyb.*	65	6 00	35 00	1 00	9 00	
m. T. w. W	○	PEARL (Rommel's).....*Rip*×.	35	3 00	15 00	50	4 00	25 00
m. T.	○	PRENTISS.....*Lab*	65	6 00	35 00	1 00	9 00	50 00
e. T.	○	POCKLINGTON .....*Lab.*	65	6 00	35 00	1 00	9 00	50 00
e. T.	◍	VERGENNES ....*Lab.*	1 00	10 00	75 00	1 50	15 00	

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6 Vines, or more, of *one variety*, at the Dozen rate.
50 " " " " " 100 "
500 " " " " " 1000 "

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